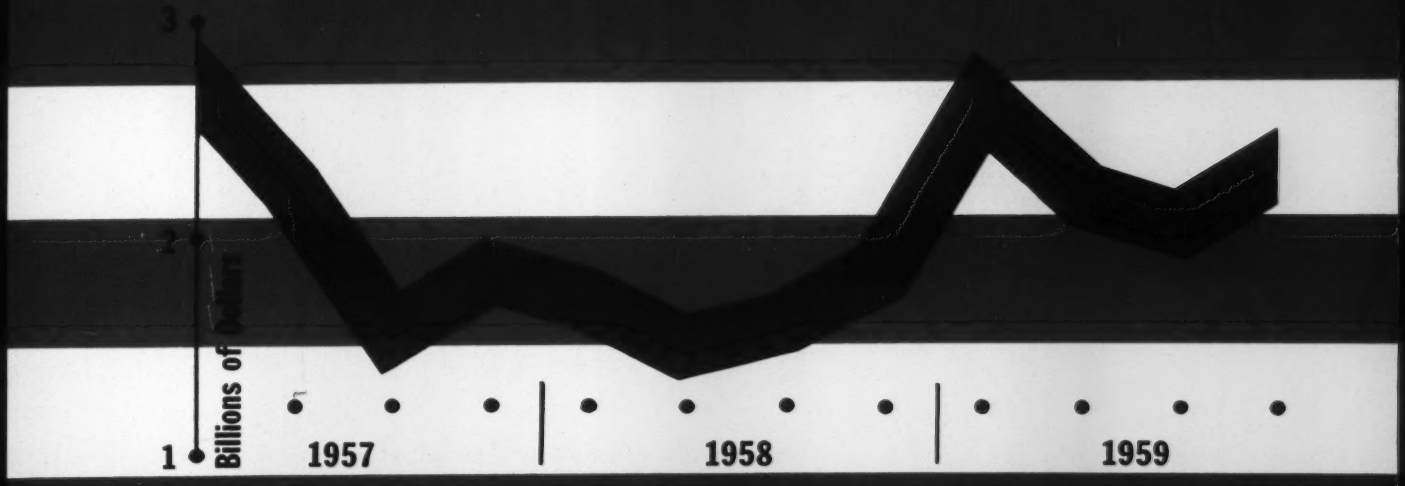
The IRON AGE

March 24, 1960 A Chilton Publication The National Metalworking Weekly

First of the 1960 Series:

Will Future Capital Spending Stretch Out the Boom?

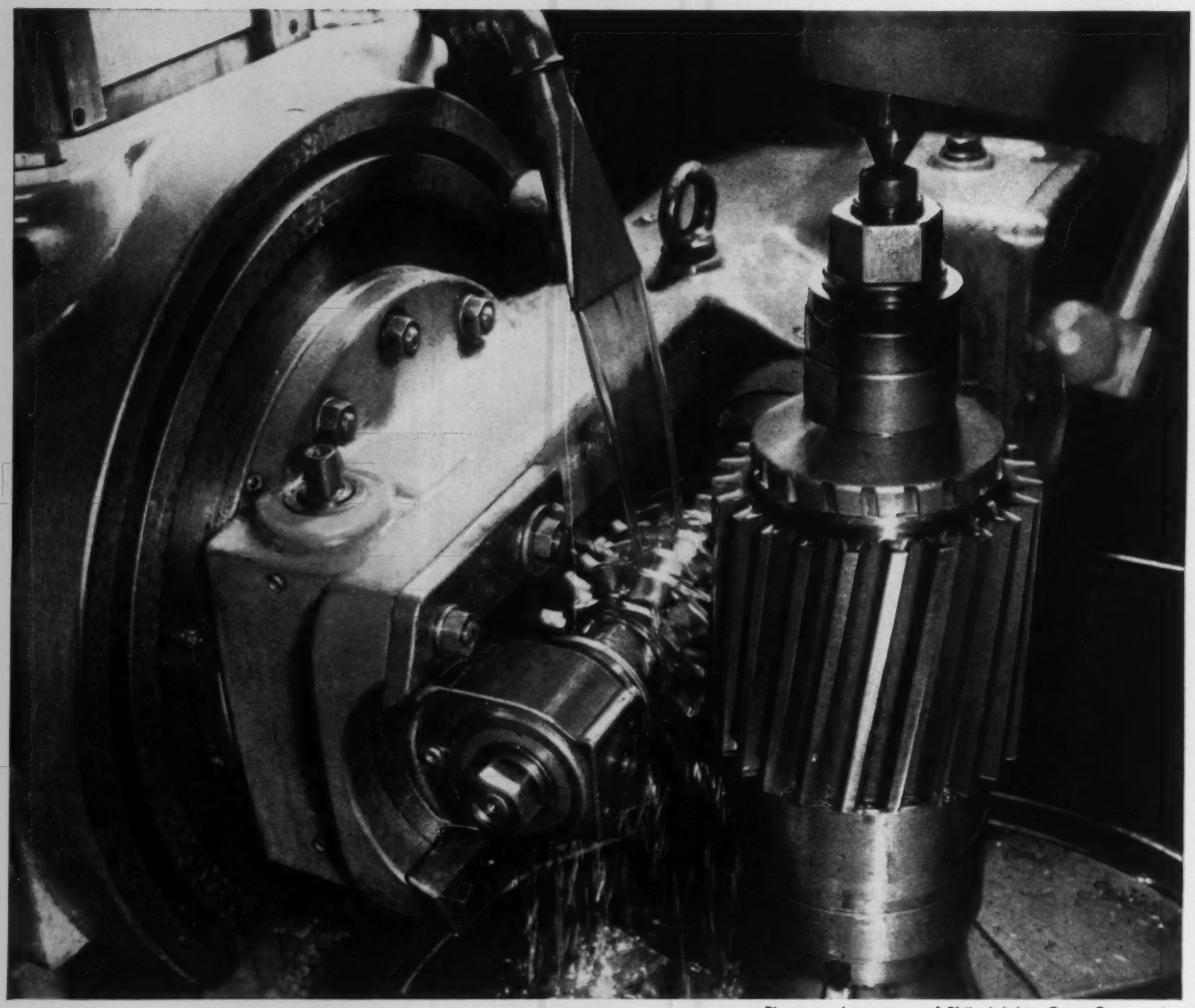


Continuing Survey of Metalworking Capital Appropriations —P. 59

How to Use Break-Even Charts — P. 87

Small Business: Part 2 — P. 49

Digest of the Week — P. 2-3



Photograph courtesy of Philadelphia Gear Corporation

Aristoloy LEADED* provides freer machining with no sacrifice of tensile strength at PHILADELPHIA GEAR

ARISTOLOY STEELS

The very qualities that make good gear steels—high-tensile strength, extreme wear and load resistance—make them difficult and expensive to machine.

Philadelphia Gear Corporation solved this problem by switching to Copperweld leaded steel.

This helical gear, for example, is being cut from a bar of Aristoloy 4140 leaded which has been heat treated to a 300 to 320 Brinell Hardness. The lead addition permits an increase in spindle RPM, increased hob feed and improvement in the number of pieces per tool grind.

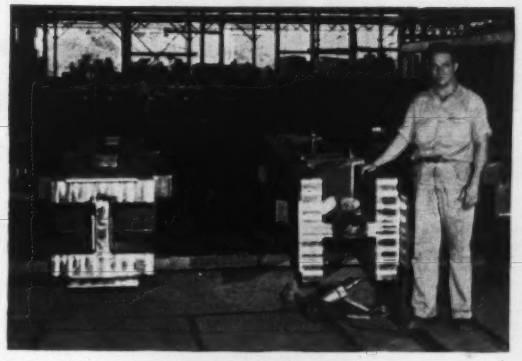
But none of the desirable strength qualities required of a gear steel are reduced by the minute lead particles. They act as built-in lubricant and in no way affect the physical properties.

Write today for Leaded Steel booklet or new Products & Facilities Catalog.

*Inland Ledloy license

COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.



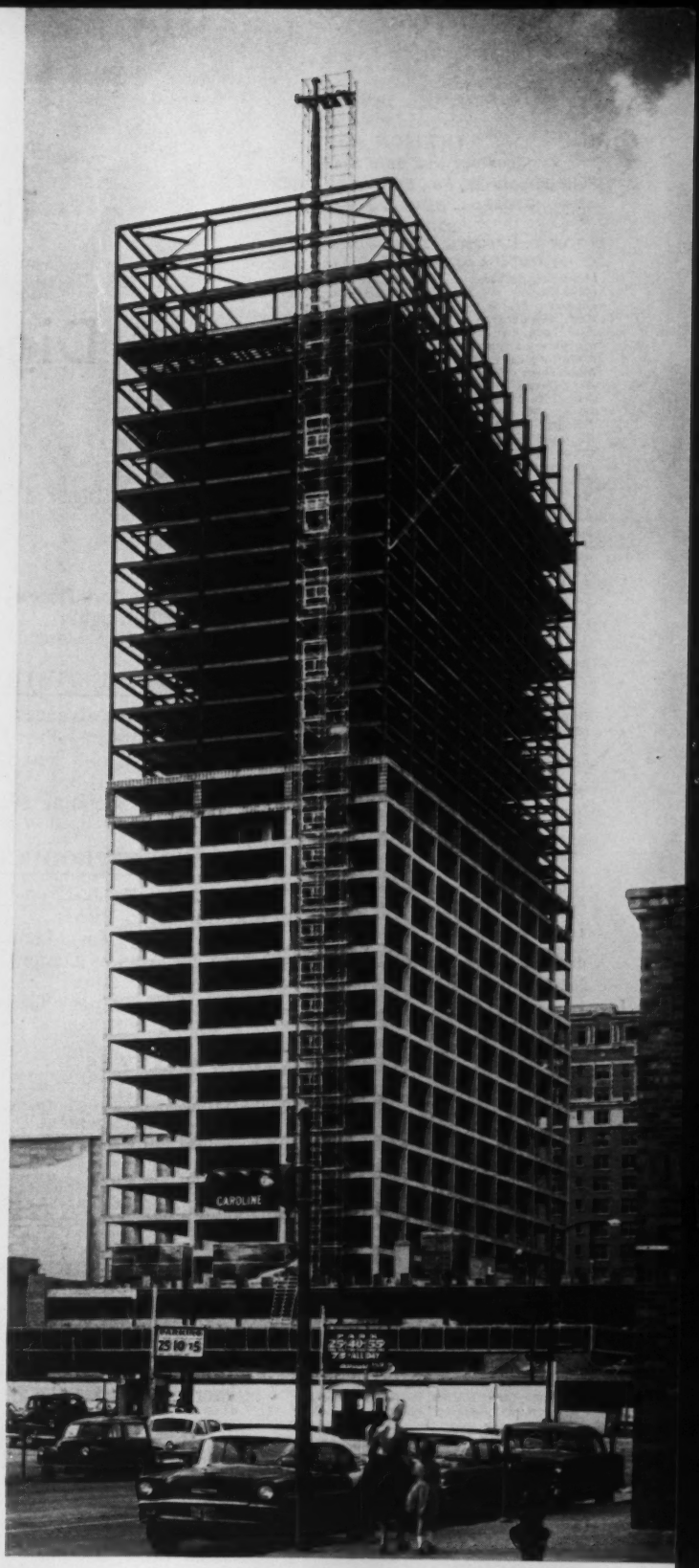
These built-up columns of Bethlehem plate were welded and fabricated in the Houston plant of Mosher Steel Company.

Built-up steel plate columns weigh 1200 lb per ft

Columns of built-up steel plate are an interesting feature of the new 31-story First City National Bank Building in Houston, Texas. Ranging in weight from 500 lb per ft to giants of 1200 lb per ft, the columns were made from Bethlehem plates, some as thick as six inches. Entirely shop and field welded, the columns and beams were erected without riveting or bolting.

The uniform quality of Bethlehem plates makes them ideal for weldments of any type. Coupled with good welding technique, the use of Bethlehem plates assures sound welds. Bethlehem plates are available in a full range of sheared and universal mill sizes. For full details, call the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation



Field erection was all-welded. Architects for First City National Bank Building: Skidmore, Owings and Merrill. Associate architects: Wilson, Morris, Crane & Anderson. Structural engineer: Robert J. Cummins. General contractor: W. S. Bellows Construction Co.; steel erectors: Peterson Brothers

Steel for strength ...economy ...eye-appeal

BETHLEHEM STEEL

BETHLEHEM STEEL

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The IRON AGE

March 24, 1960—Vol. 185, No. 12

Digest of the Week in

★Starred items are digested at right.

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COLORED METALS

More Use, Better Products — Growing use of colored metals encourages development of more durable, better looking finishes. Advances are coming from makers of sprayed vinyl coatings, anodized aluminum, porcelain enamel, and paint. P. 47

THE SMALL SUPPLIER

Part II—Second part of this series on the problems of metalworking's small suppliers. It deals with the characteristics of management stemming from the owner's dual role as owner and manager. P. 49

MATERIALS RESEARCH

Does It Lag? — The technical problems associated with many developments are often solved well in advance of the ability to adapt them commercially. P. 51

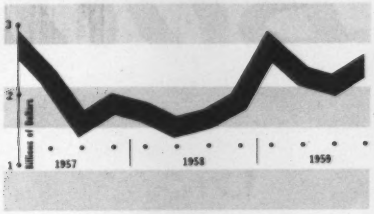
WASHINGTON

New Pressure—The Administration is under new Senate pressure to

Metalworking

First of the 1960 Series:

Will Future Capital Spending Stretch Out the Boom?



Cover Feature

SPENDING SURVEY: Capital goods spending by metalworking companies will stay strong through 1960. This optimistic report is bolstered by the latest of The IRON AGE's quarterly surveys of metalworking capital appropriations.
P. 59

pull out of commercial-type businesses that compete with private industry. P. 75

AUTOMOTIVE

Adhesive Advancements—Industry experts say aluminum engines and the need to bond dissimilar metals will lead to greater use of adhesives in automaking. P. 71

Engineering-Production Developments

BREAK-EVEN CHARTS

Their Function — Break-even charts test in advance the effect of management's decisions. The charts put you in a position to gage the business course and to pre-judge the impact of certain moves and changes. The charts will give your business a better chance of surviving periods of recession. P. 87

BOOST INGOT YIELDS

With Sideboards — Exothermic sideboards, placed inside the steel ingot mold, may soon bring major yield increases for makers of stainless and other alloy steels. The sideboards reduce the size of the cavity to be cropped away. It means that the ingot can be poured with the big end down. P. 90

WELDED DESIGN

For Machine Bases—Many companies are taking a closer look at welded design for machine bases. The secret lies in tailoring the design to welding, not casting. If the design is practical, you'll reap the benefits of steel's strength, rigidity and vibration control. P. 92

COMPUTER DESIGN

Sound Approach — A "mother" computer helps design engineers produce a second generation of computers. The real savings are in the speed, accuracy and agility that the job is handled. The method eliminates the many months spent in handling blueprints. P. 95

WAREHOUSE HEATING

Radiant Energy—Infrared radiation provides efficient heating even when the building is old and drafty. Other advantages include minimum maintenance and no danger of shutdown due to power failure. It lowers both installation and operating costs. P. 96

Market and Price Trends

WEST COAST

Aircraft Talks Due—Unions representing Farwest aircraft and missile workers will be after wage boosts of about 7 pct in new talks this spring. Boeing, with contracts running out in April and May, will be first target for unions. P. 76

DEFENSE TOOLS

Policy Changes—Word from the Pentagon indicates changes in machine tool policies are under way. It could mean new emphasis on the sophisticated tools that can cut lead time on complicated, but short-run missile parts. P. 78

STEEL SUMMARY

Price Questions — General increases in steel prices are not imminent. No general price action is likely until the first of the year. Then, there is a 50-50 chance of a moderate increase. P. 127

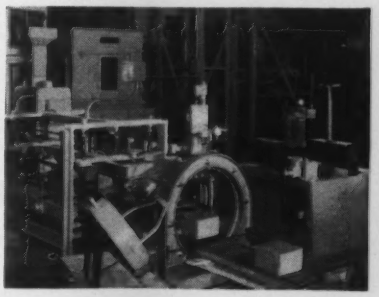
PURCHASING

Under Attack — Defense Dept. buying and inventory practices for the three services are under Senate attack. The Senate wants changes made to cut out excessive dollar wastes. P. 128

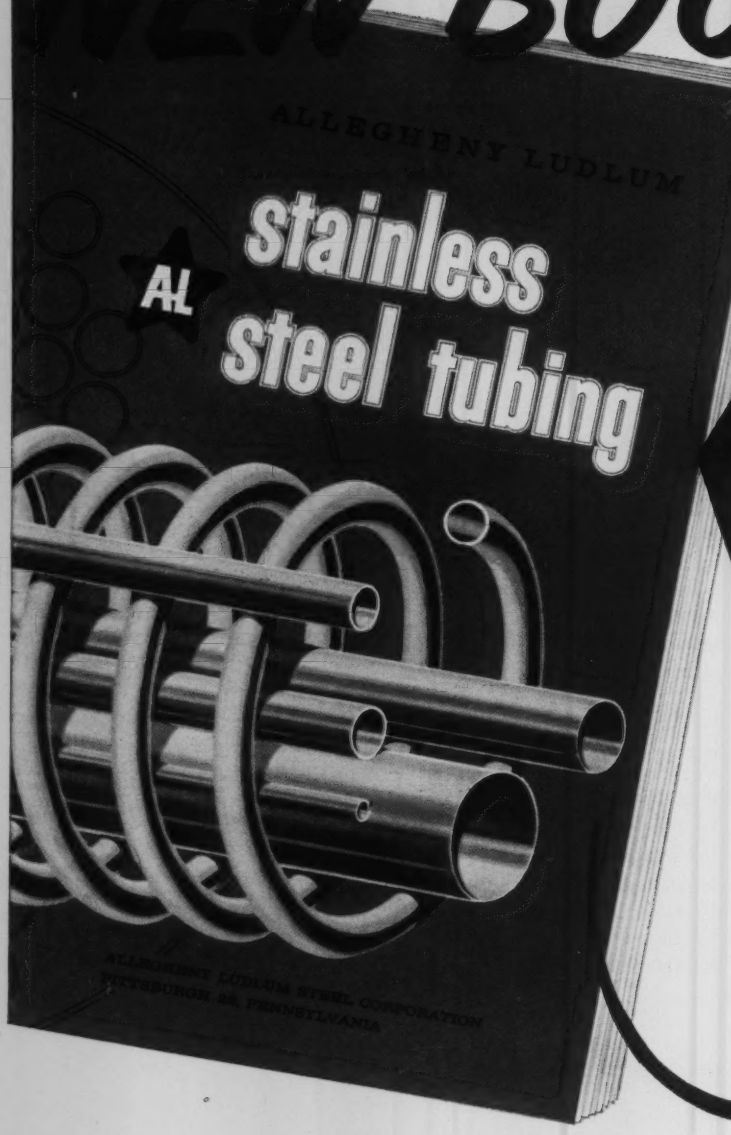
NEXT WEEK

NAIL AUTOMATION

Battles Imports — Next week's technical feature shows what U. S. nail manufacturers have done to combat the swelling tide of imports. Production costs are down, thanks to a magnetic conveyor, magnetic packaging and vibratory degreasing.



NEW BOOKLET on STAINLESS STEEL TUBING sent on request



PARTIAL LIST OF CONTENTS

- Stainless Steel grades
- Product data on Seamless Tubing and Welded Tubing
- Size range Stainless Pipe & Tubing
- Design data—Internal Pressures—Elevated Temperatures, etc.
- Corrosion resistance
- Fabrication data
- Military & Aircraft Specifications
- Industry's uses

Etc.

This 36-page booklet newly published by Allegheny Ludlum is packed with technical data and authoritative information on both welded and seamless stainless steel tubing. There are more than 20 tables for ready reference and many photographs.

It will be helpful to design engineers and others interested in solving the many critical and demanding pipe and tubing applications.

The booklet contains the best and latest information available on product and design data on the subject—the partial contents listed give some idea of its scope. You'll want a copy for your files.

Write for your free copy of Allegheny Stainless Steel Tubing, ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.*** *Address Dept. A-272.*

1287

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RM-81

Armco "Ads" are not Born in Ivory Towers

Because of the many "ads" you see in the many magazines you read, we thought you might like to see how an advertisement is prepared at Armco Steel.

The men who write Armco advertisements are not skygazers. They get specific information from many sources. It comes from customers; from Armco salesmen, and from marketing and product specialists.

After an Armco advertisement is written, it must pass a "screening test." Depending on the subject matter, from five to fourteen specialists are required to review and approve the advertisement before it is released. Last on the list are Armco Research Engineers—the most critical of all.

1. Writer in Armco's own advertising department probes for information with an Armco market specialist. When possible they use a factual account of a customer's experience with one of Armco's special steels.

2. Next, writer confers with a product specialist —a person who keeps in touch with the technical aspects of a specific grade of steel. There, he gets a refresher-course on the properties of the grade . . .

3. . . . or writer may visit a customer for the information he needs. More often than not, he departs with a note pad full of information—facts about the performance of the steel in a finished product.

4. Back with his typewriter, the copy man goes to work. His ideas and the facts he has gathered are ready to jell. If all goes well, he may write an "ad" in a few hours; others, more complicated, may take much longer.

5. When satisfied with his effort, writer has script typed and gives the text to Armco's art director for layout. Supplies pictures—often gets better ideas for illustration from head of staff or one of his artists.

6. "Ad" O.K.? Far from it—it's just ready to "run the gauntlet." Research man is one of many reviewers required to check copy and layout, correct where necessary, and initial approval. Only then, "O.K. for Publication. . . ."

New steels are born at Armco

This isn't the easiest way to "get out an ad," but we're sure it's the best way to give you helpful information you can rely on. Armco Steel Corporation, Middletown, Ohio.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Are You Lost for Time— To Better Think It Through?

We all know how to think. If we didn't, we would not be where we are now. But how to do more of it or find time to do it is another matter. Something must be done.

The visitor, the telephone, the meeting, the normal interruption—and the loss of practice—keep us from thinking. It's no better at home. Or at the club. Or on the train. Or in the car.

Paper work alone is gigantic. We have succumbed to shuffling them—or initialing them with less than close attention. On the "big ones" we do check, read and frown. Or so we say. On the phone the regular query is, "Oh yes, now what did you say?"

One good old rejoinder is, "Things are different now; we had time in the 'good old days'." That's true—and we used it to good advantage too. Today's competition and swirl and whirl appear to give us no time to think. But if this keeps up, we will do nothing but act—from preconceived behavior patterns which classify action as "the thing" no matter why it is done.

Of course, we have people who think all the time. We have others who say they can act and think at the same time. Others claim to be able to read a report while a high-priced assistant is making his report. Others are proficient in talking on the phone while making serious decisions on something else.

Most of us are not in that genius class. We badly need the time to sort out our emotional reactions from the facts. We need time to marshal our experiences. We need time to study our man, our problem, or our gamble. Today, most of us are forced to go into action less than adequately prepared.

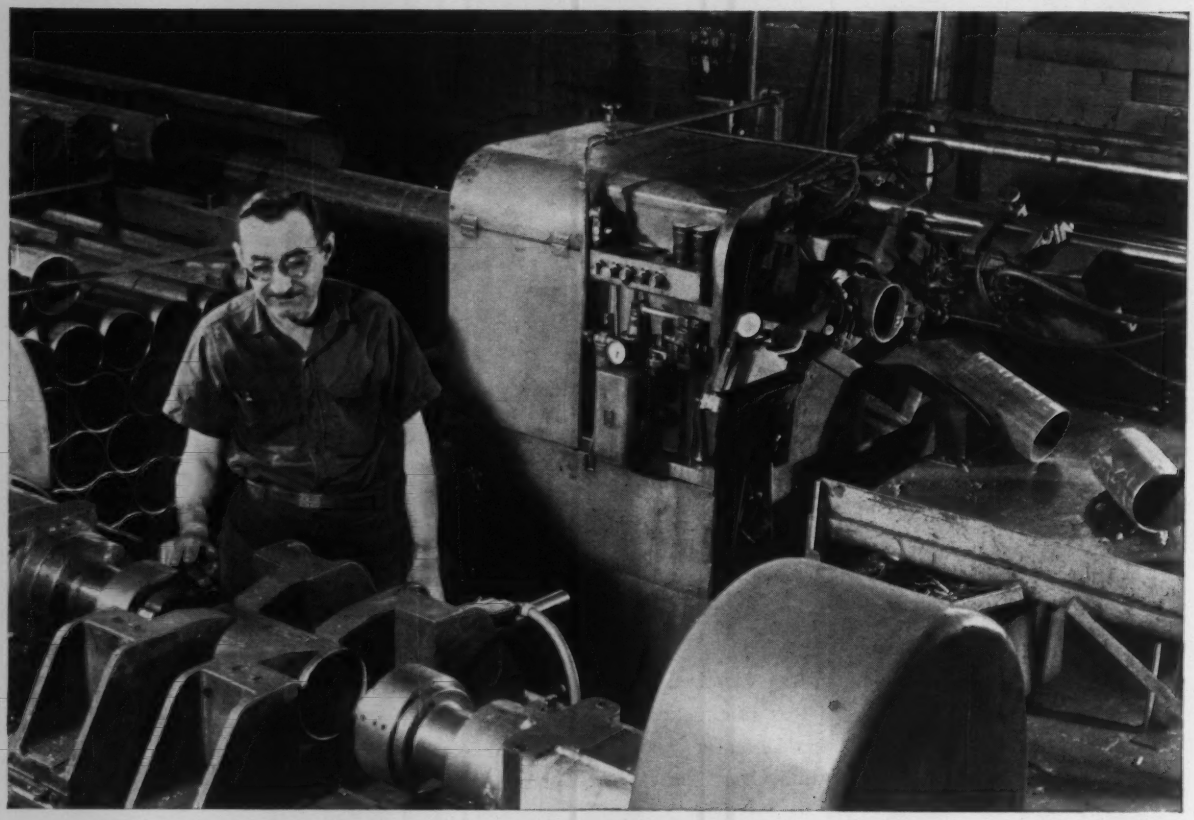
Survival is the watchword. The "great life" isn't here yet. Now that we must be accountable to a far greater degree for our mistakes—covered or otherwise—just plowing ahead in order to "do something" isn't the answer by a long shot.

Hotels have it. It says, "Do not disturb." Business men have to have it soon. The "man thinking" card will have to make its appearance —and be respected. It must not mean a flight from reality. It must mean a flight to new reality. You just can't have action without some thought beforehand.

If you don't take time—alone—for retreats to the thinking world, you may be on a treadmill—and not know it—until too late!

Tom Campbell

Editor-in-Chief



Tubing for this job must meet the most rigid specs

This manufacturer of heavy-duty idler rollers has turned to increased automation and tighter material specs to improve production. Note automatic feed and cutoff of tubing in background . . . the quick setup for double-end counterboring at the next station.

Tubing for this job must meet highest standards for uniformity of size, straightness and close tolerance of concentricity. But where do you find large O.D. tubing to meet these rigid specs? At Ryerson, of course—home of the industry's tightest quality controls.

Here you choose from the nation's largest stocks. And you're assured of consistent quality that is so important to meet the demands of automation. The more automated your production line, the less chance for visual inspection, and the more dependent you are on the consistent quality of the raw material.

So when you next need tubing or help with selection and application problems, be "Metalogical"—call Ryerson.

The type of tubing you need is here

Carbon Steel Tubing—seamless and welded, round and square, cold drawn and hot finished.
Alloy Steel Tubing—seamless rounds.
Fluid Power Tubing—Rockrite cylinder finish, seamless and welded; hydraulic fluid line; seamless and welded cylinder tubing.
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Mill Expects Good Earnings

Cost controls are being tightened at a major steel mill. As a result, the mill expects to make more money this year than ever before. But, February returns at the mill indicate that 1960 isn't going to be a year when anyone can relax.

Propose Standard Tooling

A recently-formed group proposes standards to simplify tooling for diversified machinery. Their aims include: uniform table heights and dimensions, fixed T-slots and locations, and standard spindle tapers. Impact of the results is expected to be more widespread than the building block standards for transfer machines proposed last year. More than 18 industries were represented.

Fuel for the Future?

Uranium monocarbide—a sleeper in the race for better nuclear reactor fuels—may move out in front of uranium alloys and uranium dioxide. In any case, reactor metallurgists at Battelle Memorial Institute report that it should be considered a promising entry in the race, on the basis of recent research. With a melting point of 2315°C, uranium monocarbide withstands about twice the heat uranium can take.

Copper Slows Germ Growth

One major brass fabricator believes it can prove that copper noticeably inhibits bacteria growth. The company is almost ready to apply this to the markets. A spokesman says it may open a new area for ductwork, trim and hardware in hospitals, laboratories and doctor's offices.

Prepare for Adhesives

Recent studies point up the effects that metal preparation has on environmental resistance of stainless steel bonds. Standard chemical etch, sand blasting, emery abrading and vapor honing were used. Then, a conventional film-adhesive was applied with the normal curing cycle. Results show that comparable room-temperature strength is obtained with all preparation methods. However, only the bonds made after using the chemical etch withstand salt spray and high humidity.

Is Tax Relief in Sight?

President Eisenhower plans to speak up in detail on the need for tax cuts. He'll make his views known late this year—just before going out of office. He will urge depreciation tax reform, lower corporate rates, some relief for individuals and greater reliance on excises. What action is taken depends entirely upon the new Congress.

Process Clads Complex Parts

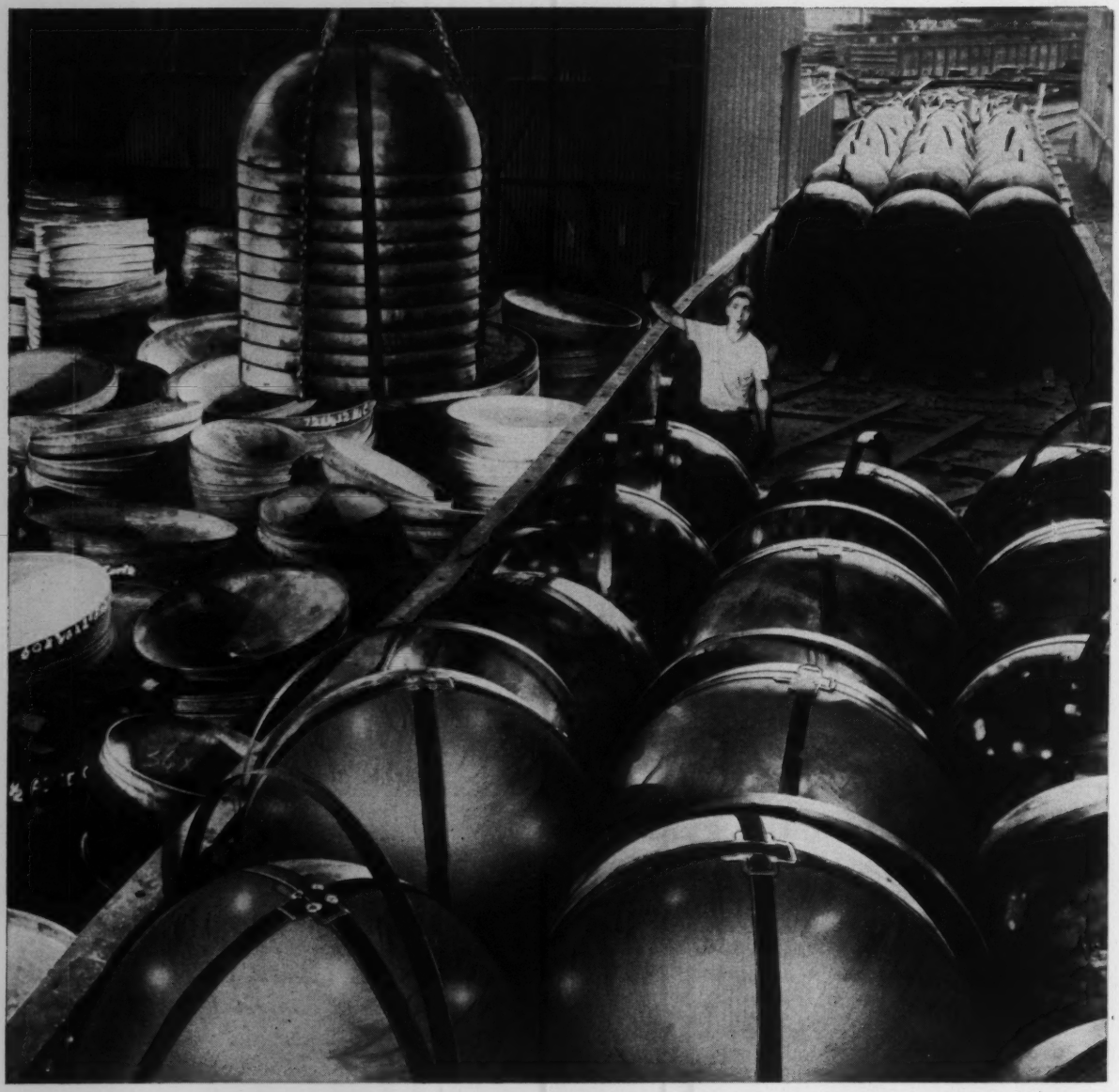
Employing extrusion methods, a new process clads both simple and complex shapes. This permits close dimensional control over the cladded product. It also provides a strong bond between the core and the cladding material. In addition, the process speeds the cladding of many complex parts which can't be clad by standard methods.

Electrical-Heat Research

A large electric company is quietly telling some of its suppliers that it expects nine out of ten of the homes built in the U. S. 10 years from now to be electrically heated. The purpose: To get suppliers started on the research that's necessary to develop new components as soon as possible.

Magnify Time by 100,000

An ultra-high-speed movie camera stretches the events of one second into 28 hours. It takes from 480 to 1,600,000 pictures per second on standard 35-mm film—in black and white or color. This permits scientists and engineers to "freeze" motion while studying arc discharges, explosive reactions and high-frequency fatigue.



Get fast delivery—order COMMERCIAL heads

COMMERCIAL tank heads, cold formed in steel dies, are more accurate than spun heads, yet actually cost you less. That's because their consistent uniformity makes fitting-up easier . . . welding faster. And, you get this advantage in every size and style—in fact, in every single head . . . just one or a whole carload.

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For full information on heads in stock for immediate delivery, write to Commercial Shearing & Stamping Company, Dept. K-13, Youngstown 1, Ohio.

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Census

Sir—Just a note to tell you how much we enjoyed reading your article "How Census Will Aid Marketers" in your March 3 issue of The IRON AGE. Your article caught the main theme behind the Census and we are very happy to see how you entitled your article, as the 1960 Census releases will mean much to all people in all industries and other facets of business.—E. F. Doidge, Business Analyst, U. S. Dept. of Commerce, Field Services, Phila.

For Reprint

Sir—In our company magazine "National News," scheduled for publication in April, 1960 we should like to include the following material from your March 3 issue of The IRON AGE—the editorial —"The Fabulous Competition: Better Get Ready for It Now."—David O'Connor, Editor, National News, The National Screw & Manufacturing Co., Cleveland.

■ **Permission granted.—Ed.**

The Hillman

Sir—In your article on the Hillman cars in the March 3 issue it looks to me as though the $4.8 million retail value should be $4.8 billion.—Dave Newcomb, Beverly, Mass.

■ **Reader's right—should have been the billion dollar figure.—Ed.**

Cutting Fluids Dollar

Sir—In the March 3 issue of The IRON AGE, there is an article "How to Get More for Your Cutting Fluids Dollar." We would appreciate receiving three additional copies.

This is a very interesting article and I am sure the industry will benefit from it.—E. G. Althoff, Asst. Purchasing Agent, Frigidaire Div., General Motors Corp., Dayton, O.

Sir—If still available for distribution, I would like to include in my personal file, one copy of your excellent article "Cutting Fluids." —E. G. Grey, Industrial Engr., Dept. of the Navy, U. S. Naval Avionics Facility, Indianapolis, Ind.

■ **Reprints are on the way.—Ed.**

Steel Capacity

Sir—I have just read the article in the March 10 issue relating to the district ingot rates report which was started by American Iron and Steel Institute two weeks ago. The article was very well done and the publication of the district capacities broken down by companies in the district should be real interest to your readers.

Briefly, I think, you have performed a real service to your readers and the steel industry. I want to thank you for the constructive manner in which you handled this subject. — M. D. Howell, Executive Vice President, American Iron and Steel Institute, New York.

"It's a great excuse, but you're in the wrong office."

3300°F

- Ceramic Metallizing
- Sintering
- Silicon Depositing and Diffusing
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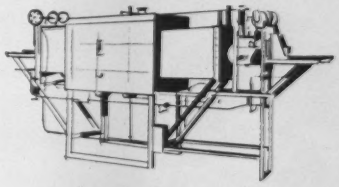
A Compact, Economical-to-Operate Unit featuring molybdenum-wound elements . . . the Hayes Type M-Y Furnace is ideal for high-temperature, close-tolerance work requiring uniform heats from 2700° to the 3300° F. range.

For Research or Production, versatile Hayes Type M-Y furnace is ready-built for a variety of reducing, non-oxidizing, or inert atmospheres . . . dry forming gas, dissociated ammonia, hydrogen, nitrogen, or argon. M-Y features include: (1) moly-wound muffle for maximum length of temp. uniformity, (2) water-jacketed cooling sections

HAYES TYPE M-Y "MOLY" FURNACE



with precise temp. regulators for optimum control of atmosphere cooling, (3) extended insulated throat areas to minimize thermal shock, (4) special atmosphere arrangements to obviate atmosphere contamination, and (5) automatic feed mechanisms.

Results Guaranteed! The Hayes answer to your high-temperature heat treating problem — whether it involves *ceramics, electronics, or metallurgy* — includes *customized* techniques, correct placing and fixturing of work, proper atmosphere selection, and precise time-temperature cycles. To improve your product, increase production, and reduce costs, do it the Hayes way.

WRITE for M-Y Furnace BULLETIN 5805 **today.**

C. I. HAYES, INC.

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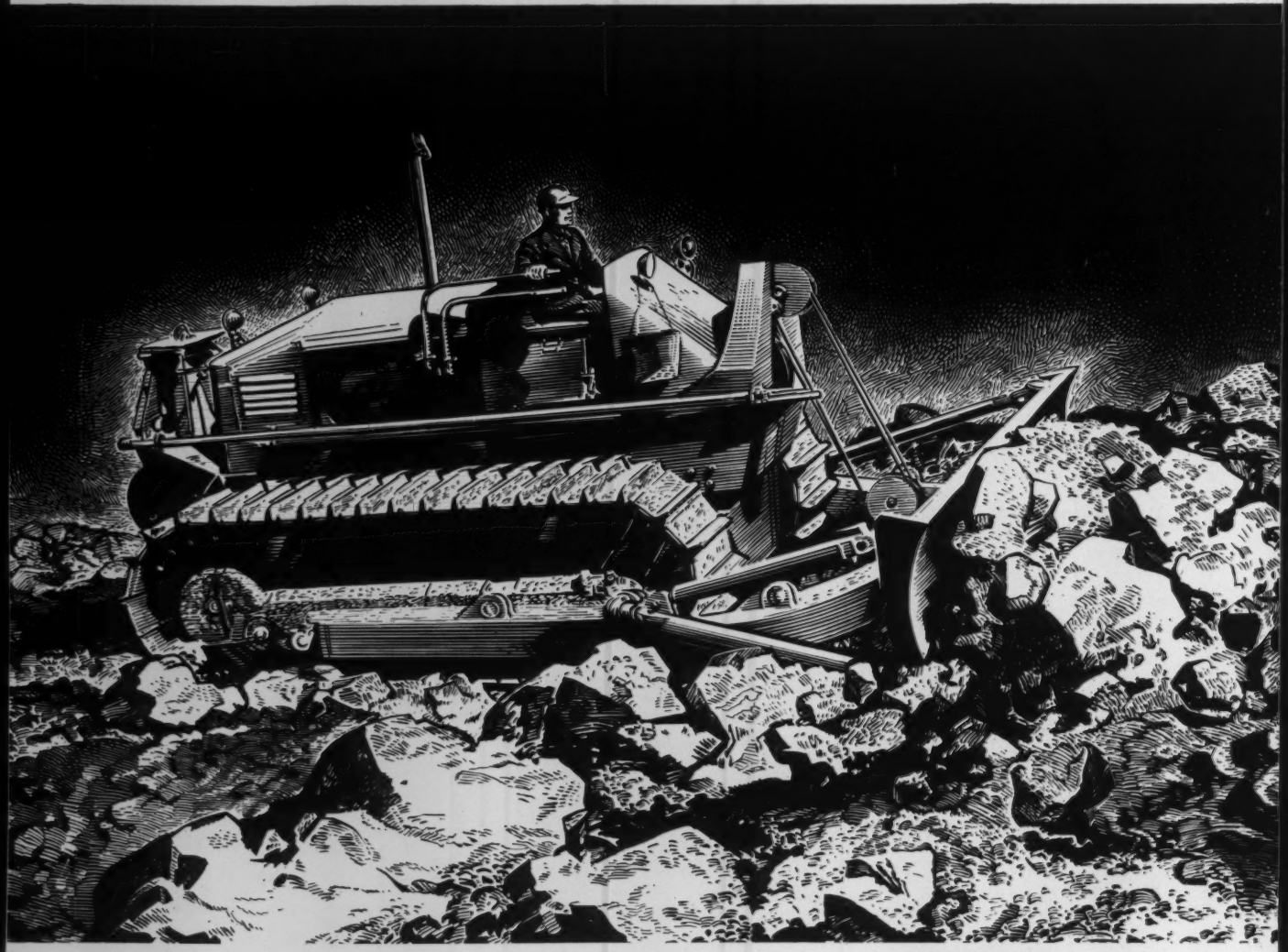
Established 1905

ELECTRIC FURNACES

It pays to see Hayes for metallurgical guidance, lab facilities, furnaces, atmos. generators, gas/liquid dryers.

MORSE TOOLS HELP BUILD CHARACTER FOR EIMCO



...Morse tough tools cut smooth, fast holes...help speed production of mining machines with guts.

For rough, rugged power, you can't beat Eimco mining machines. They move rock and ore . . . carry them up steep grades quickly and easily.

It takes tough tools to make these rugged machines. It takes Morse Cutting Tools . . . the toughest on the market. They cut smoother, faster – and last longer.

Let Morse help you make your tough jobs easy. Call your Morse-Franchised Distributor today. He'll give you the story.

MORSE

means "THE MOST" *in Cutting Tools*

MORSE TWIST DRILL & MACHINE CO., NEW BEDFORD, MASSACHUSETTS

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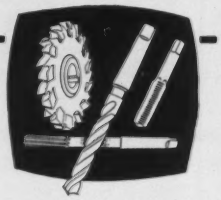

Morse means more production . . . smoother, more accurate production . . . with every type of cutting tool from drills, reamers, taps and dies, to end mills, milling cutters, slitting saws and "specials". So, if you want the best from every cutting tool you buy, mark your order "MORSE". For if you want *Morse Quality*, there's only one way to get it . . . *specify Morse.*

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FATIGUE CRACKS

Capital Survey

Does your company need a crystal ball?

Well, we don't have one. But for judging the future course of business in coming months, we think our quarterly survey of metalworking's capital appropriations is the next best bet.

Here you'll find out what metalworking companies are planning to spend on new plants and equipment in the next six to twelve months.

No Guesswork—The figures you'll find in the survey beginning on P. 59 this week are not opinions, guesses or estimates. They are taken right off the books of some 481 metalworking companies.

These companies operate 1190 plants with 500 or more production workers. They account for 2,673,000 plant workers or 67 pct of all production workers employed in metalworking in plants 500 or over.

Capital appropriations made by these companies are gathered and compiled for The IRON AGE by The National Industrial Conference Board in complete confidence.

Spend and Tell—We can't even see industrial company figures.

In fact, the Conference Board told us of one executive (name and company **not** disclosed) who challenged the figures in his industry as being too high.

Little did he know that his own top management was responsible for adding to the rising total.

But it's the overall picture that counts. To find out what 37 different metalworking industries are planning to spend through 1960, turn to p. 59.

For Posterity

Twenty-five years from now people opening a time capsule in Westbury, N. Y., will be able to find out what happened in metalworking in 1960.

The capsule, placed in the new warehouse and office building being built for Gilbert Merrill Steel Corp., contains a copy of The IRON AGE.

Steel Prices—Also included in the capsule are company records, local bank records, latest steel specifications and prices, and newspapers.

Gilbert Merrill Steel Corp., established three years ago, distributes carbon, alloy and stainless steel bars.

DO NOT OPEN: Not until 1985, that is, Gilbert Merrill, right, president of Gilbert Merrill Steel Corp., is helped by his daughter Abby, 8, and Frederick Hainfeld, Jr., president, Long Island Trust Co., in loading a copy of The IRON AGE into a time capsule.

CAR HEARTH FURNACES

FOR

HEAT TREATING
STRESS RELIEVING
ANNEALING
HOMOGENIZING
600°F TO 2500°F

DIRECT FIRED OR FORCED CONVECTION, OIL, GAS, ELECTRIC

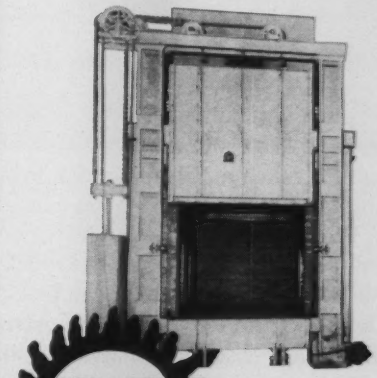
R-S CAR HEARTH FURNACES are batch type furnaces with movable hearth for ease of loading and unloading. They can be designed to your specifications as direct fired units for temperature range from 1000° to 2500°F. or as forced convection units from 600° to 1600°F.

R-S CAR HEARTH FURNACES can be built to utilize oil, gas or electricity, whichever is the most economical for your plant. Whatever the charge weight, length or width required R-S engineers can design and build the furnace to meet your requirements most efficiently.

R-S CAR HEARTH FURNACES have proved themselves throughout the world. In foundries for heat treatment of steel and iron castings. In metal working plants for stress relief of weldments, annealing, normalizing, spherodizing and forging, or to heat for rolling, forming, or forging.

For full details on R-S Car Hearth Furnaces write to...

R-S FURNACE CO., INC.
NORTH WALES, PA.



R-S FURNACES

SLICE COSTS BY SLICING PARTS FROM EXTRUDED SHAPES

Fabricating parts from long lengths of "premachined" shapes reduces machining, scrap, and finishing

The lock components shown above are typical of some 20 different precision brass parts which Welch, Inc., Waukegan, Ill., makes for its broad line of locks and latches, from Anaconda extruded shapes.

Welch works closely with Anaconda specialists from early design stages. New lock mechanisms are built around parts which can be cut by a metal slitting saw from long lengths of extruded shapes with minimum subsequent machining and scrap. The use of bar stock is never considered when there is the slightest possibility of designing savings into a part by means of a brass extrusion.

Superior quality, too. Parts made from extruded shapes are characterized by their strong, homogeneous, wrought-metal structure. And the smooth, extruded surfaces reduce many finishing operations.

More and more manufacturers are cutting fabricating costs *and* maintaining quality by using these preformed or, in effect, "premachined" shapes. For imaginative and practical help in adapting extruded shapes to the economical production of intricate parts, call your Anaconda representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 6044

Extruded Shapes • Special-Shape Tubes • Die-Pressed Forgings

ANACONDA®

products made by The American Brass Company

COMING EXHIBITS

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Powder Metallurgy Show — April 25-27, Drake Hotel, Chicago. (Metal Powder Industries Federation, 60 E. 42nd St., New York.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

1960 Castings Congress & Exposition—May 9-13, Convention Hall, Philadelphia. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

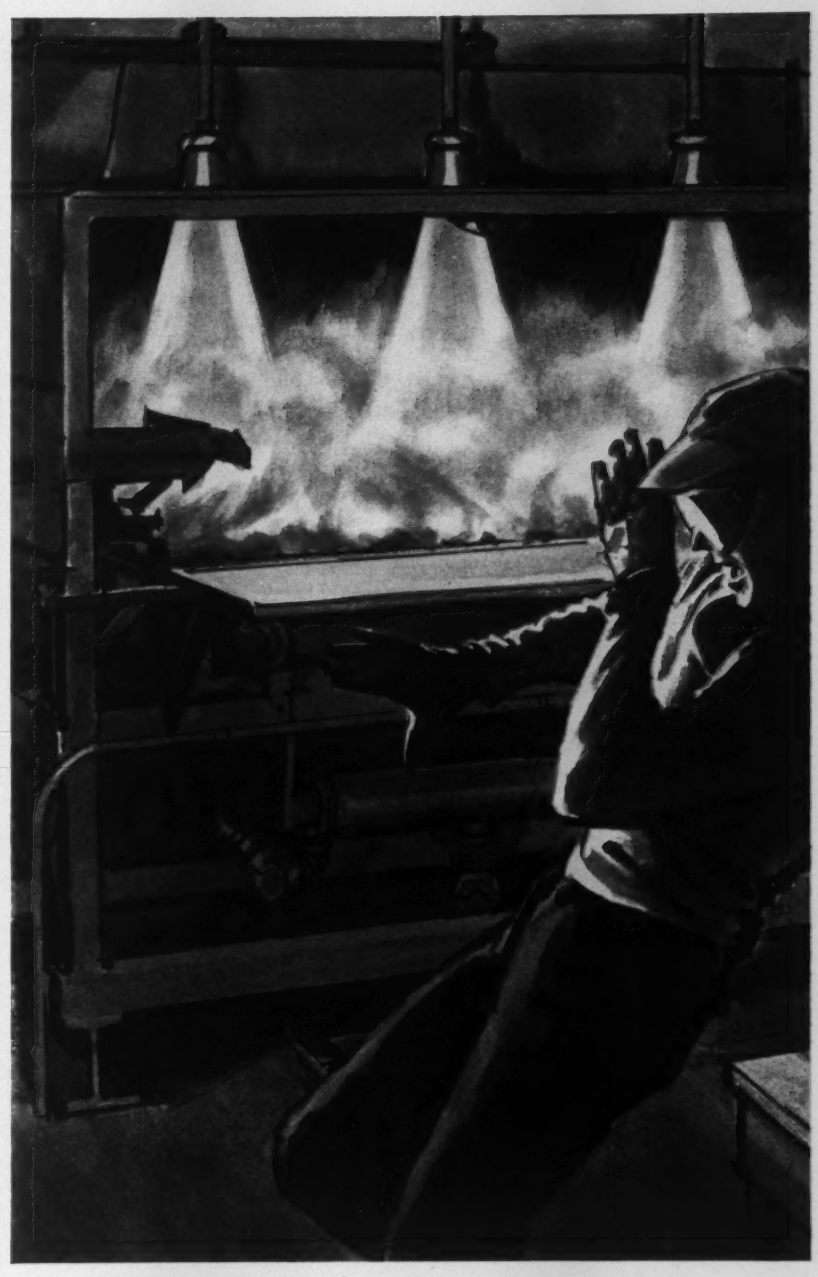
MEETINGS

MARCH

Scientific Apparatus Makers Assn. —Annual meeting, March 27-31, Boca Raton Hotel & Club, Boca Raton, Fla. Association headquarters, 20 N. Wacker Dr., Chicago.

Assn. of Lift Truck & Portable Elevator Mfrs. — Spring membership

(Continued on P. 16)



Instant bankruptcy! In a flash, fire can put you out of business. Protect dangerous flammable liquid hazards (like the coater shown above) with a *fully-automatic* Kidde carbon dioxide extinguishing system. Approved by U.L. and F.M., Kidde systems smother fire in seconds, leave no mess, turn off power and sound an alarm . . . get you back in production fast! Kidde's 35 years' experience can help you protect *any* hazard . . . write today and find out how.

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One of the outstanding advantages of Townsend Tuff Tite fasteners is that they provide an economical means for leakproof joining of metal, asbestos, porcelain or plastic. The pre-assembled conical neoprene washers flow into the holes as the fasteners are seated, filling them and making waterproof seals. Tuff Tites are effective for any application requiring leakproof joints, such as those needed in the construction or appliance industries.

Tuff Tite advantages include ease and economy of installation, surface protection and vibration resistance. Standard items are immediately available from jobbers and warehouses. Tuff Tites are also available in numerous special designs to suit any application need.

If you are joining metal, plastic, porcelain or asbestos, you should know about Townsend Tuff Tites. Ask your Townsend representative, or we will send you complete literature. Townsend Company, Engineered Fasteners Division, P.O. Box 71-B, Ellwood City, Pa.

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Cherry Rivet Division · Santa Ana, California

In Canada: Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario

MEETINGS

(Continued from P. 15)

meeting, March 28, Pittsburgh-Hilton, Pittsburgh. Association headquarters, One Gateway Center, Pittsburgh.

The Material Handling Institute, Inc.—Spring meeting, March 28-29, Pittsburgh-Hilton, Pittsburgh, Institute headquarters, One Gateway Center, Pittsburgh.

The Industrial Truck Assn.—Spring meeting, March 28-30, Pittsburgh-Hilton, Pittsburgh. Association headquarters, One Gateway Center, Pittsburgh.

Monorail Mfrs. Assn. — Spring meeting, March 28-30, Pittsburgh-Hilton Hotel, Pittsburgh. Association headquarters, 71 West 35th St., New York.

Gas Appliance Mfrs. Assn., Inc.—Annual meeting, March 30-April 1, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters, 60 E. 42nd St., New York.

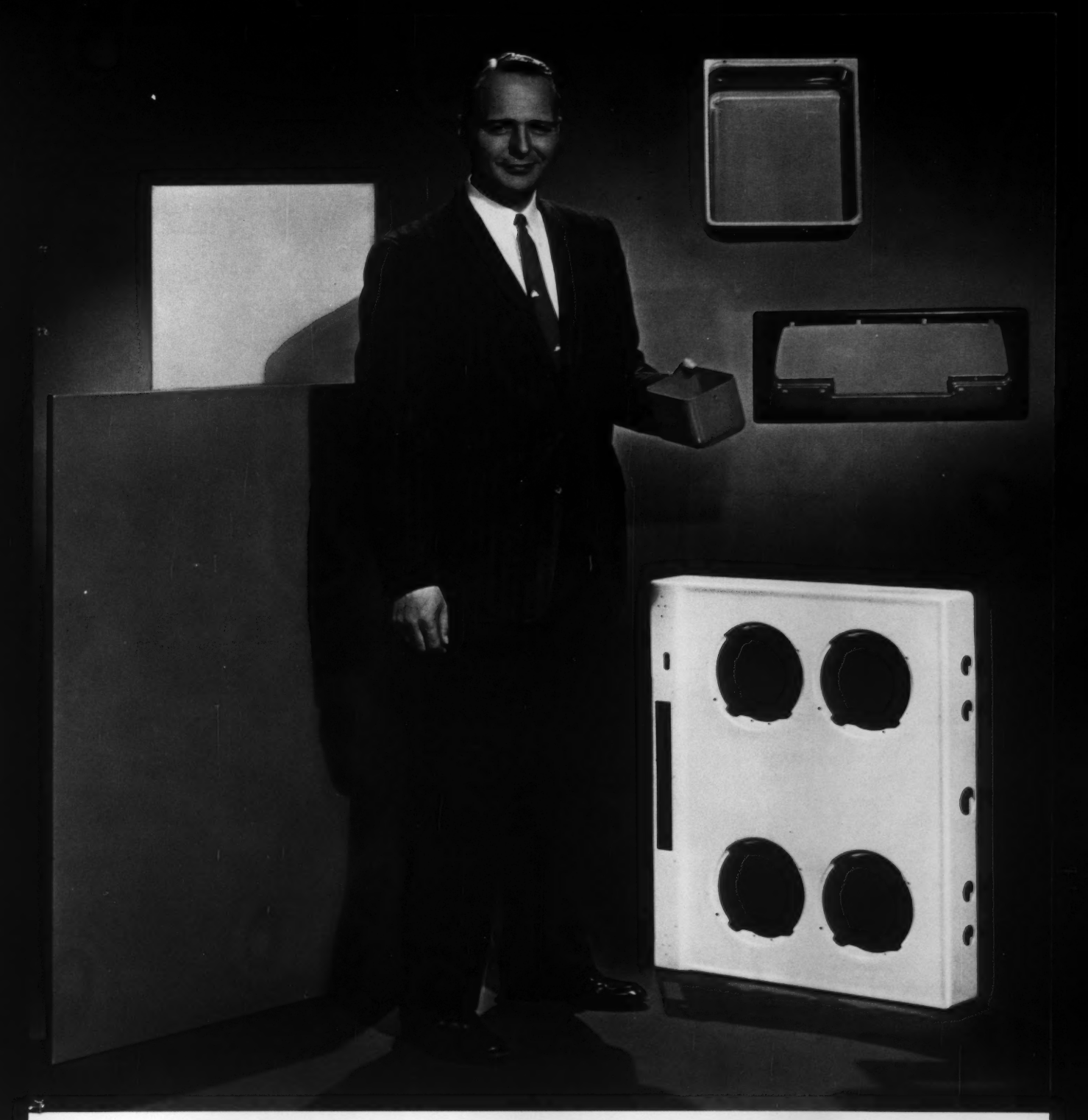
APRIL

The Metallurgical Society of AIME—Nuclear Congress, April 3-8, The Coliseum, New York. Society headquarters, 29 West 39th St., New York.

The Metallurgical Society of AIME—National Open Hearth Steel Conference & Blast Furnace, Coke Oven, & Raw Material Conference, April 4-6, Palmer House, Chicago. Society headquarters, 29 West 39th St., New York.

Steel Shipping Containers Institute, Inc.—Annual meeting, Apr. 12-14, The Breakers, Palm Beach, Fla. Institute headquarters, 600 Fifth Ave., New York 20, N. Y.

American Machine Tool Distributors Assn.—Spring meeting, Apr. 18-20, The Greenbrier, White Sulpher Springs, W. Va. Association headquarters, 1500 Massachusetts Ave., N. W., Washington 5, D. C.



BETHNAMEL

a brand ***NEW*** *kind of* ***STEEL SHEET***
for porcelain enameling

BETHLEHEM STEEL

NEW BETHNAMEL

BETHLEHEM STEEL

...superb results at low costs

...for either two-coat or direct-on porcelain enameling

Here is a totally new kind of steel sheet which provides a really outstanding enameling job, not only in the standard two-coat process but for single, "direct-on" cover coating too.

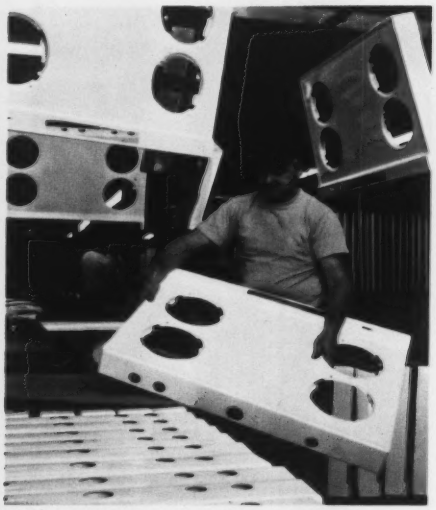
Developed by Bethlehem research engineers, Bethnamel is produced by an entirely new method. This new sheet has the amazingly low carbon content of about .003 pct, barely 1/10th that of ordinary enameling iron. Other elements are properly balanced to maintain superb enameling properties, and provide good sag resistance, drawability, and weldability, as well.

Single-Coat with Minor Changes in Cycle

With Bethnamel, boiling and fish-scaling are no problem, making this remarkable new sheet far superior to other enameling materials in the direct-on cover coat process. Simple, inexpensive modifications of existing two-coat pre-treatments are all that are needed to assure excellent adherence and rich appearance of the enamel.

Direct-on Method Cuts Costs

Bethnamel costs no more than conventional enameling iron. Thus enamelers can save on processing without adding to base metal costs. Bethlehem engineers are anxious to help you get started with this superior enameling sheet. If you're interested, by all means let our nearest sales office give you full details.



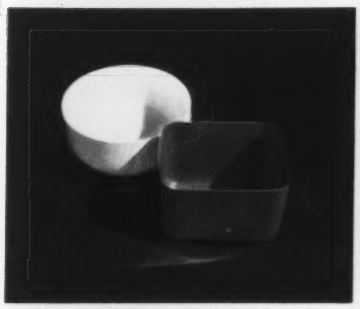
RANGE TOPS DEEP-DRAWN at Caloric Appliance Corp., Topton, Pa., are unusually tough draws, because of the relatively sharp corners. Bethnamel sheets take this severe drawing beautifully, prior to enameling.

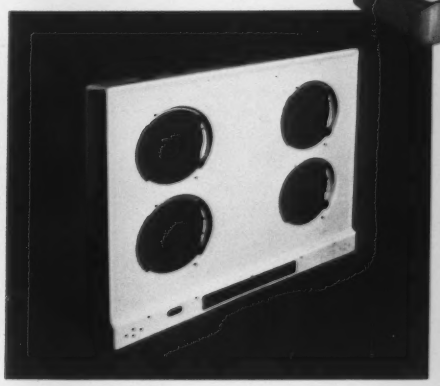
GAY PORCELAIN-ENAMELED PANELS on this school speak for the rapid growth of colorful curtain wall construction. Bethnamel sheets have proved ideal for these applications, due to high sag resistance and excellent enameling properties.

BETHLEHEM ENGINEERS WILL

BETHNAMEL EASY TO DEEP-DRAW

Drawing-quality Bethnamel sheets can be deep-drawn with superior results, as shown in this group of tough-to-make porcelain-enameled articles. No splits or cracks here!



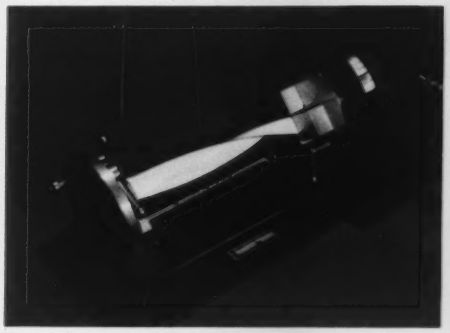


SUPERIOR SAG RESISTANCE

These 20-ga samples of Bethnamel (A), enameling iron (B), and cold-rolled steel (C), demonstrate that Bethnamel's sag resistance is better than that of enameling iron, and far superior to cold-rolled sheet steel, at firing temperatures of 1600 degrees.

ENAMEL THAT REALLY STAYS ON

In this torsion test, a simple angle of direct-coated Bethnamel was twisted 180 degrees without damage to the enamel. Because its thickness is only 3 to 4 mils, compared to 6 to 8 mils or more for 2 coats, a direct-on enamel can withstand much rougher handling!



TYPICAL MECHANICAL PROPERTIES

20-Gage Bethnamel Sheet

	Yield Strength (psi)	Tensile Strength (psi)	Total Elongation	Rockwell B	Olsen Cup Test (inches)
Longitudinal	26,000	43,000	38 pct	43	0.425
Transverse	28,000	44,000	40 pct		

HELP YOU WITH YOUR STEELWORKING PROBLEMS

BETHLEHEM STEEL

NEW BETHNAMEL
lights up like a lamp!

Now sheet-steel-and-ceramic panels can light up a room without bulbs, tubes, filaments, or cathodes! Called Panelescent® Lighting, this revolutionary "area" source of light is a development of Sylvania Lighting Products. A whole ceiling can become one huge lamp, or specific portions of an area can be lighted up, as in the automobile instrument panels shown here.

New Bethnamel sheet steel is proving to be a very practical base metal for Panelescent® applications. Sylvania is just one of many companies which are growing increasingly enthusiastic about Bethnamel. The future looks bright, both for Bethnamel and the porcelain enameling industry!

"Panelescent®" is Sylvania's registered trade name for electroluminescence

Steel
is strong, ductile, versatile... AND BETHLEHEM MAKES IT IN NEARLY EVERY FORM

Here's a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded steels
Special rolled sections

TOOL STEELS:
Water, oil, and air-hardening grades

ROD AND WIRE:
General and special-purpose types
Fine and shaped wire

FORGINGS:
Drop, press, hammer, and upsetter
Rolled-and-forged sections

SHEETS:
Hot- and cold-rolled
Continuously galvanized
Enameling sheets

TIN MILL PRODUCTS:
Electrolytic and hot-dip tinplate; blackplate

PLATES:
Universal and sheared
Flanged and dished heads

FASTENERS:
Bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
Continuous butt-weld
Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS:
Frames, tanks, housings, vessels

FREIGHT CARS, PARTS, WHEELS, AXLES

WIRE ROPE AND SLINGS

RAILS:
Tee, crane, girder

CASTINGS:
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Room 1041,
Bethlehem Steel Company, Bethlehem, Pa. M10

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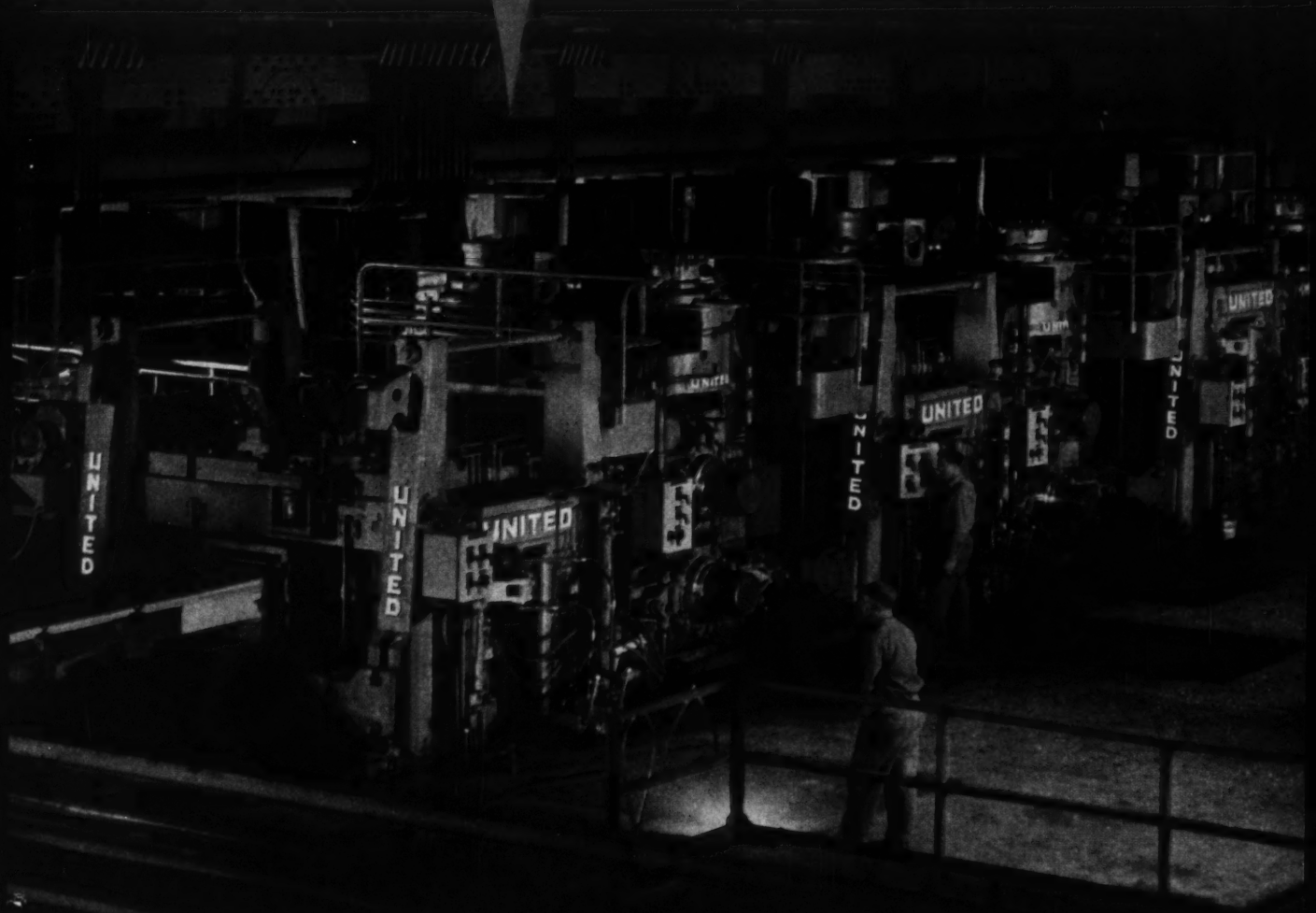
BETHLEHEM STEEL

BETHLEHEM STEEL

UNITED®

6–Stand continuous horizontal and vertical Billet Mill



UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

KEMP LEAD MELTING POTS *give you 5 exclusive advantages!*

Where speed plus top control counts, you can count on Kemp Immersion Heaters to give you accurate heat control in annealing, tempering, lead and tin melting and many other applications. Here's why:

1 Only Kemp Immersion Heaters are equipped with the exclusive Kemp Carburetor that pre-mixes air and gases. This means lower labor costs . . . more complete control . . . much faster starting.

2 Only Kemp puts the heat where it belongs—next to the material to be melted. Only Kemp uses recirculation heat tubes to transfer heat from the gases to the melt. Overruns and lags are virtually eliminated.

3 Only Kemp eliminates exposed flames, hazards to workers, equipment and plant. Burner is enclosed in heating tube.

4 Only Kemp assures you of no cracked pots at any time. Kemp pots are designed with a safety factor above the level of controlled heat.

5 Only Kemp gives you accurate temperature control at all times. Set the Kemp unit and forget about it. Kemp's exclusive heater design assures your melt will always, automatically, be uniform.

See the man from Kemp if you're in need of reliable immersion heater equipment. Write today for Bulletin IE-11 or call your local Kemp representative.

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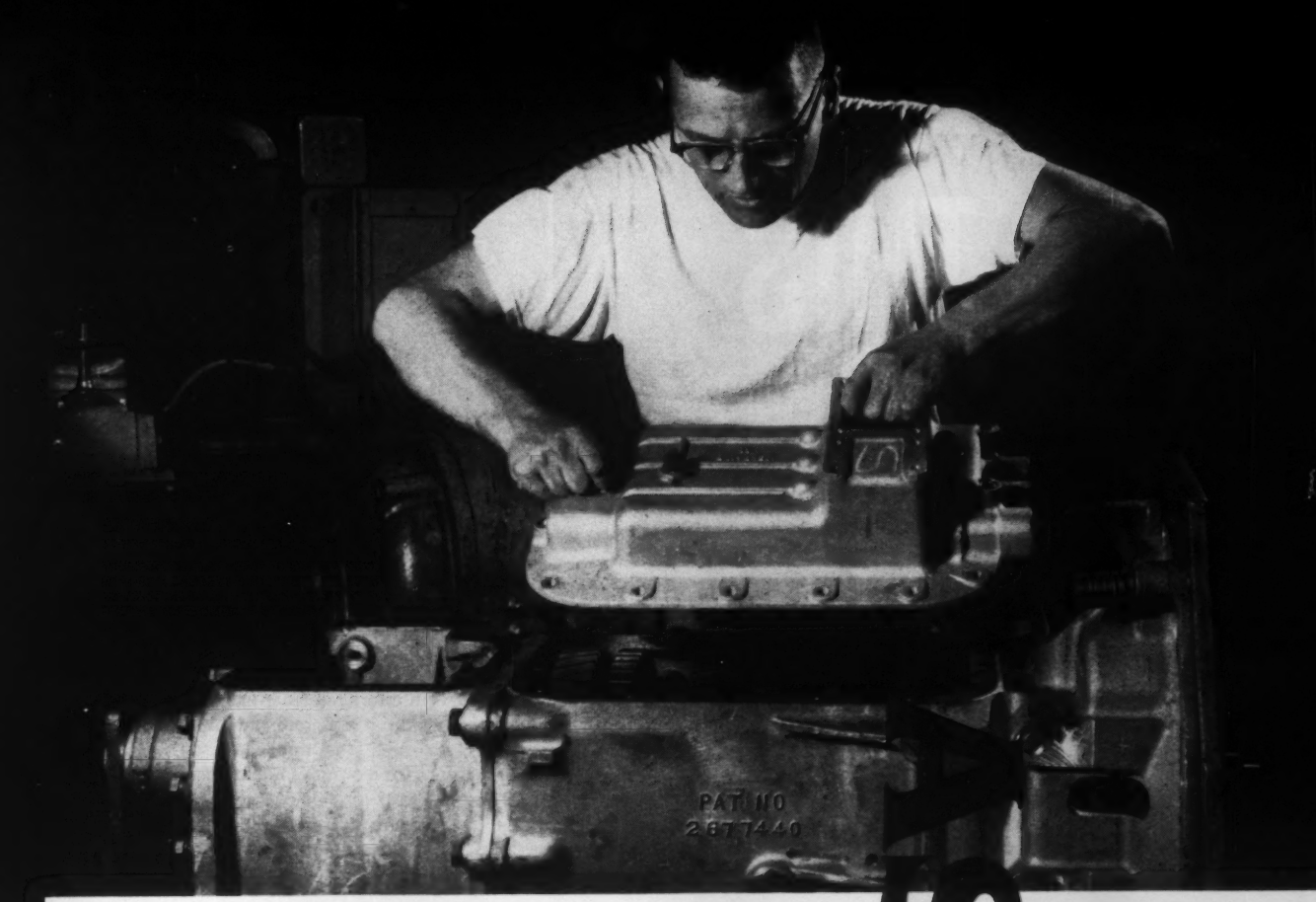
THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver St., Baltimore 2, Md.



This transmission shift housing is one of several truck engine parts now cast of Tenzaloy for high strength without weight.

High strength aluminum castings without heat treatment:

TENZALOY
THE SELF-AGING ALUMINUM ALLOY

Tenzaloy is a corrosion resistant aluminum alloy that ages at room temperatures, delivers high strength properties without costly solution treating, quenching, and artificial aging. No special foundry techniques are required; no fluxes. Castability is excellent with sand cast and plaster molds, and many permanent molds. Tenzaloy castings have superior machinability, take a brilliant polish, anodize clear white. Write for TENZALOY Bulletin No. 103 to: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, N. Y., or call your nearest Federated sales office.

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FEDERATED METALS DIVISION

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St. Louis: Jackson 4-4040

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Prospect 1-2175

DALLAS, TEXAS
Adams 5-5034

DETROIT 2, MICHIGAN
Trinity 1-5040

EL PASO, TEXAS
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3-1852

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MINNEAPOLIS, MINN.
Tuxedo 1-4109

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New York: Digby 4-9460

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Locust 7-5129

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THIS IS DU PONT DELRIN®

a new engineering material offering the user distinct performance and cost advantages in many applications once reserved for metals

The three new products on the opposite page typify the performance and cost advantages that "Delrin" acetal resin offers over die-cast zinc and aluminum, cast and machined brass, stainless steel and cast iron.

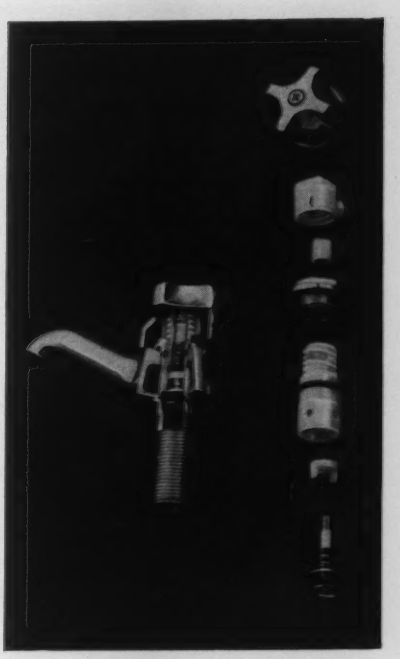
Ronson, for example, has reduced a part's weight by 80%... Kel-Win cut production costs by 80% . . . Lionel saves on assembly with a one-piece coupler design.

This ability of "Delrin" to perform in many areas once reserved for metals stems from its unique combination of properties. "Delrin" has the stiffness to remain rigid in large sections, the tensile and flexural strength to withstand high-stress loadings, the dimensional stability to hold close tolerances and the abrasion resistance to operate usually without lubrication. "Delrin" retains these properties even under exposure to wide variations in temperature, humidity, solvents and stress.

"Delrin" also offers the user the economies of production via injection molding and extrusion—processes that can usually reduce costs by eliminating all finishing operations. Part-to-part uniformity minimizes rejects. To simplify assembly, parts may be joined by mechanical fasteners, spin welding, snap and interference fits or often designed as multi-function, integral units. Varied surface effects are achieved by texturing, vacuum metalizing, painting or molding in color.

We will welcome the opportunity to assist you in evaluating how "Delrin" can help you improve a product, lower its cost or develop new designs for your profit. A letter or the enclosed coupon will bring a prompt reply.

The head frame (top) of the new "Lady Ronson" Superbe electric shaver is molded of "Delrin", saving 80% of the weight of the previous goldplated die-cast zinc part. Ronson Electric Shaver Corp., Stamford, Conn., specified "Delrin" because only it could be molded to and hold the necessary dimensions, have a smooth luster without finishing and resist body oils and colognes.

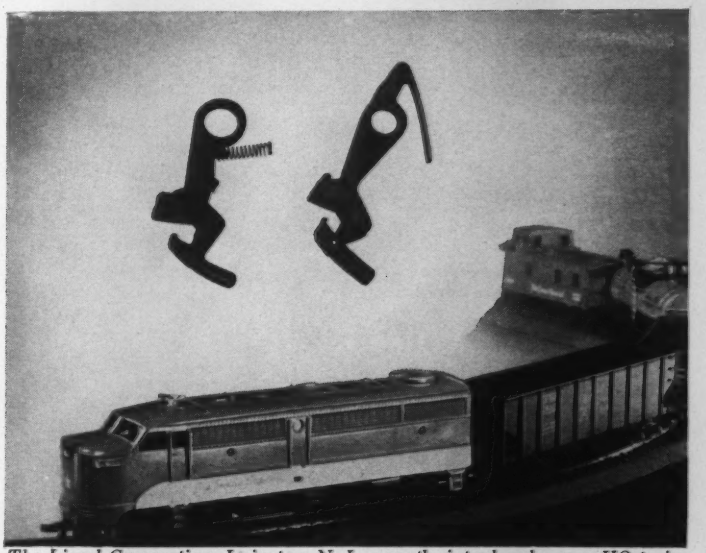


Four parts (in white) of this self-seating faucet are molded of "Delrin", saving 80% of the cost of the machined brass components formerly used by the Kel-Win Manufacturing Co., Inc., Richmond, Va. Kel-Win chose "Delrin" because only it resists corrosion and mineral buildup, remains dimensionally stable and keeps handles comfortable to the touch. Cost savings accrue from the elimination of machining operations and rejects. (Molded by Dominion Plastics Co., Colonial Heights, Va.)

THIS IS WHAT DELRIN® IS DOING

With commercial production of "Delrin" a reality, hundreds of manufacturers are now producing or have specified "Delrin" for such uses as: gears, bearings, housings, aerosol bottles, clothing fitments, pump and valve parts, conveyor belt plates and a host of mechanical components. Three products are described here.

The broad range of the 500 applications of "Delrin" tested during the past three years prompts our belief that "Delrin" may well be profitably used in the products you make or use. Commercial processors and our own staff of technologists are ready to assist you.



The Lionel Corporation, Irvington, N.J., recently introduced a new HO train line featuring a one-piece coupler molded of "Delrin". Because "Delrin" has the resilience to provide the desired springing action, Lionel designed the integral unit to replace a two-part assembly of coupler and coil spring. The result: a significant assembly saving plus a new sales feature. "Delrin" is also used for the axles, journals and two other truck parts. (Molded by Lionel and Gries Reproducer Corp., New Rochelle, N. Y.)

POLYCHEMICALS DEPARTMENT

DU PONT
REG. U.S. PAT. OFF

Better Things for Better Living . . . *through Chemistry*

FOR MORE SPECIFIC INFORMATION MAIL THIS COUPON...

E. I. du Pont de Nemours & Co. (Inc.) Dept. U-324
Rm. 2507D, Nemours Building, Wilmington 98, Delaware

I am interested in evaluating "Delrin" for the following use:

_____

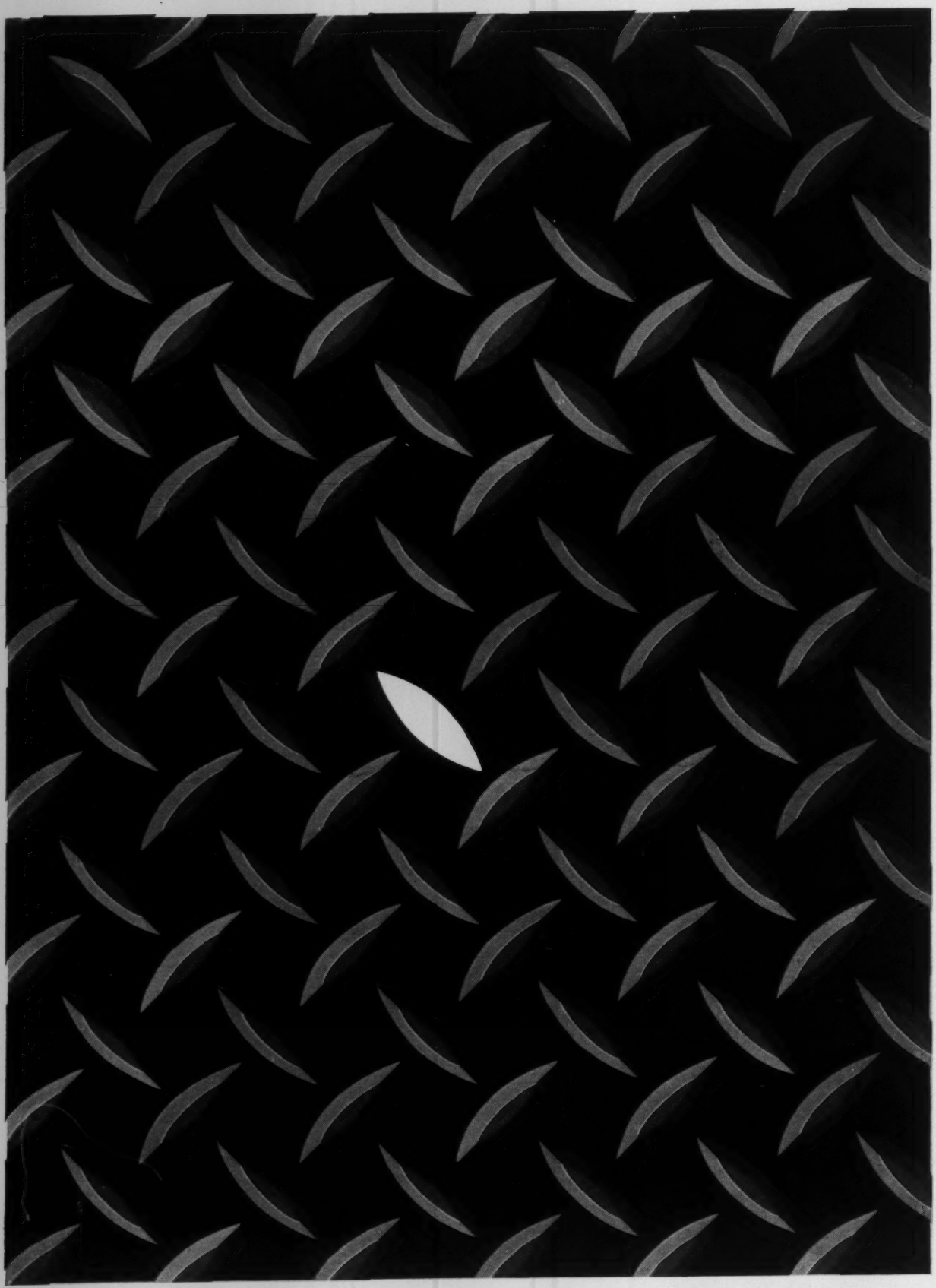
NAME_____

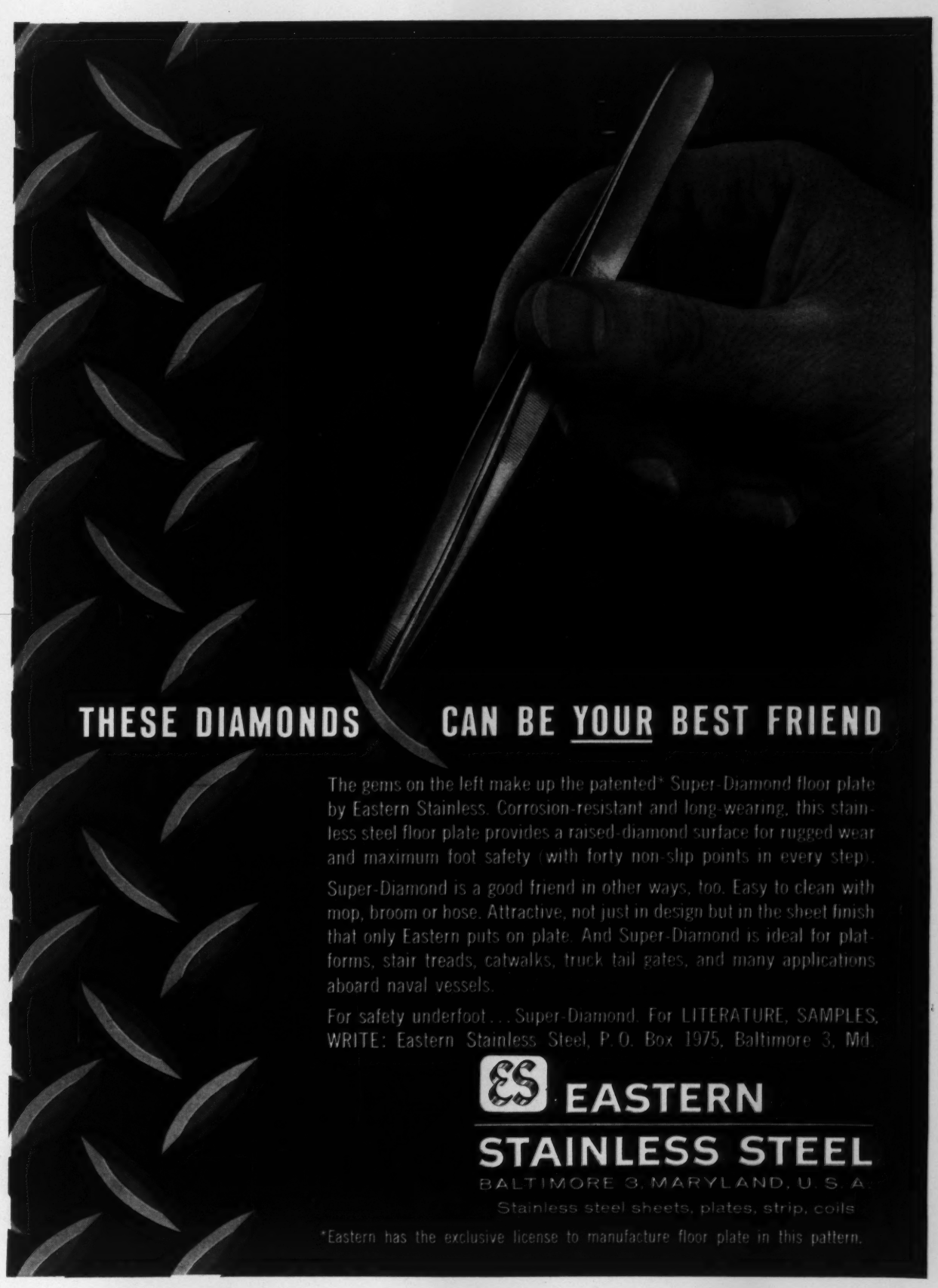
COMPANY_____ POSITION_____

STREET_____

CITY_____ STATE_____

In Canada: Du Pont of Canada Ltd., P.O. Box 660, Montreal, Quebec





THESE DIAMONDS CAN BE YOUR BEST FRIEND

The gems on the left make up the patented* Super-Diamond floor plate by Eastern Stainless. Corrosion-resistant and long-wearing, this stainless steel floor plate provides a raised-diamond surface for rugged wear and maximum foot safety (with forty non-slip points in every step).

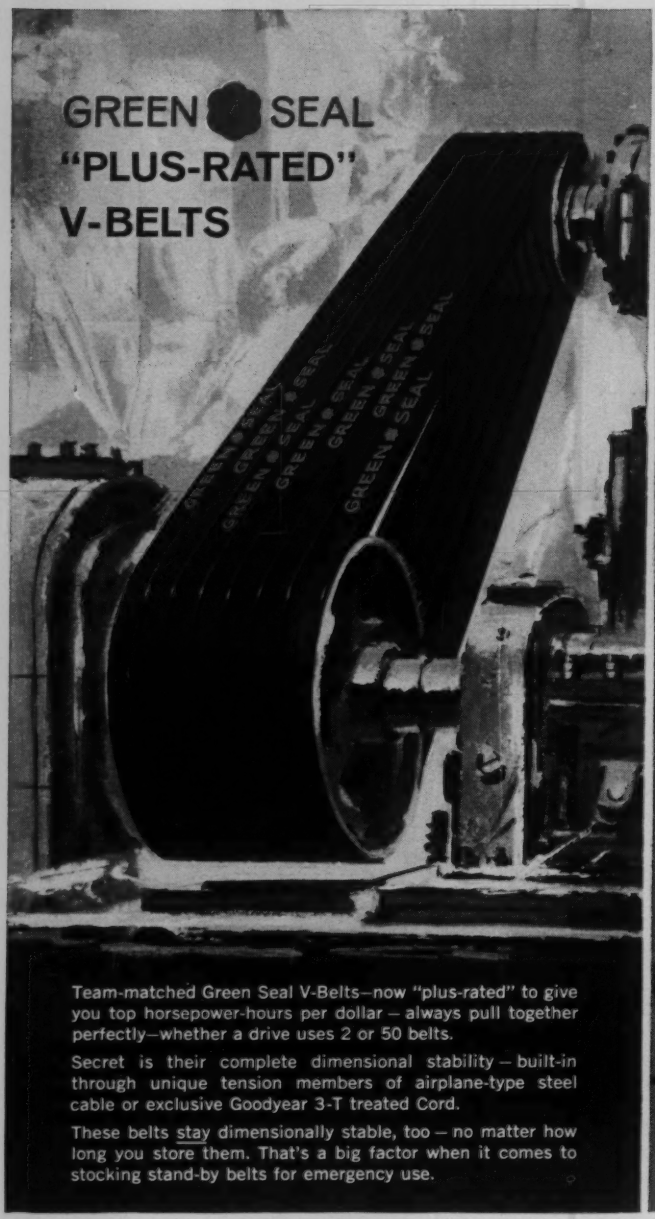
Super-Diamond is a good friend in other ways, too. Easy to clean with mop, broom or hose. Attractive, not just in design but in the sheet finish that only Eastern puts on plate. And Super-Diamond is ideal for platforms, stair treads, catwalks, truck tail gates, and many applications aboard naval vessels.

For safety underfoot... Super-Diamond. For LITERATURE, SAMPLES, WRITE: Eastern Stainless Steel, P. O. Box 1975, Baltimore 3, Md.

EASTERN
STAINLESS STEEL
BALTIMORE 3, MARYLAND, U. S. A.
Stainless steel sheets, plates, strip, coils

*Eastern has the exclusive license to manufacture floor plate in this pattern.

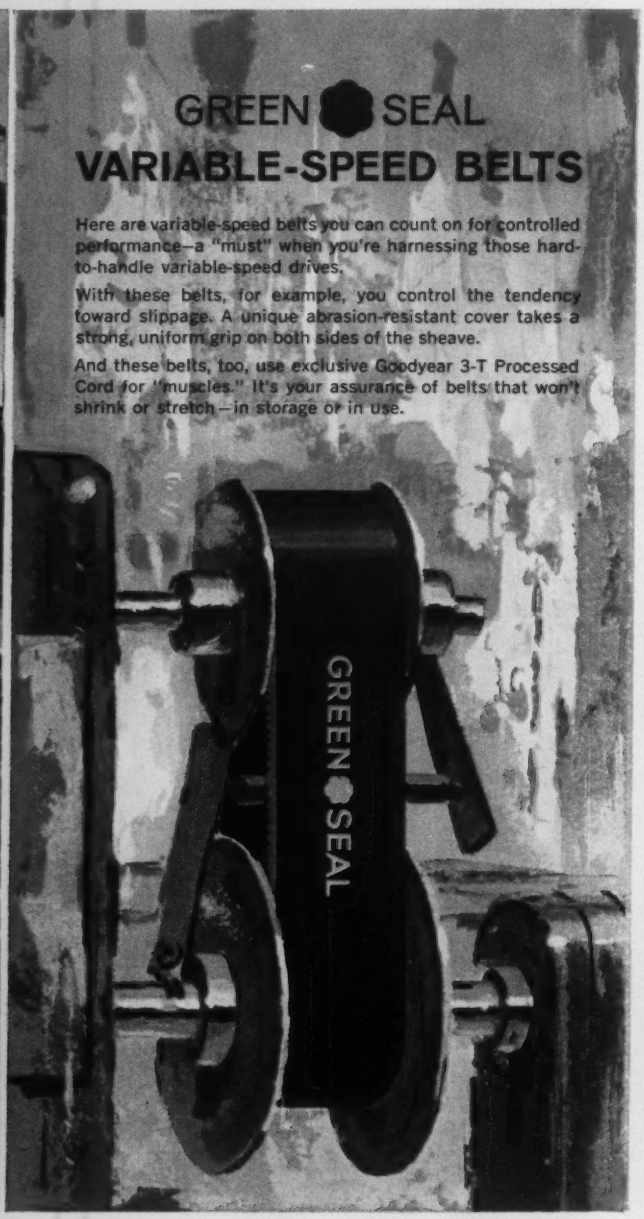
to beat all your belting problems...



Team-matched Green Seal V-Belts—now "plus-rated" to give you top horsepower-hours per dollar – always pull together perfectly—whether a drive uses 2 or 50 belts.

Secret is their complete dimensional stability – built-in through unique tension members of airplane-type steel cable or exclusive Goodyear 3-T treated Cord.

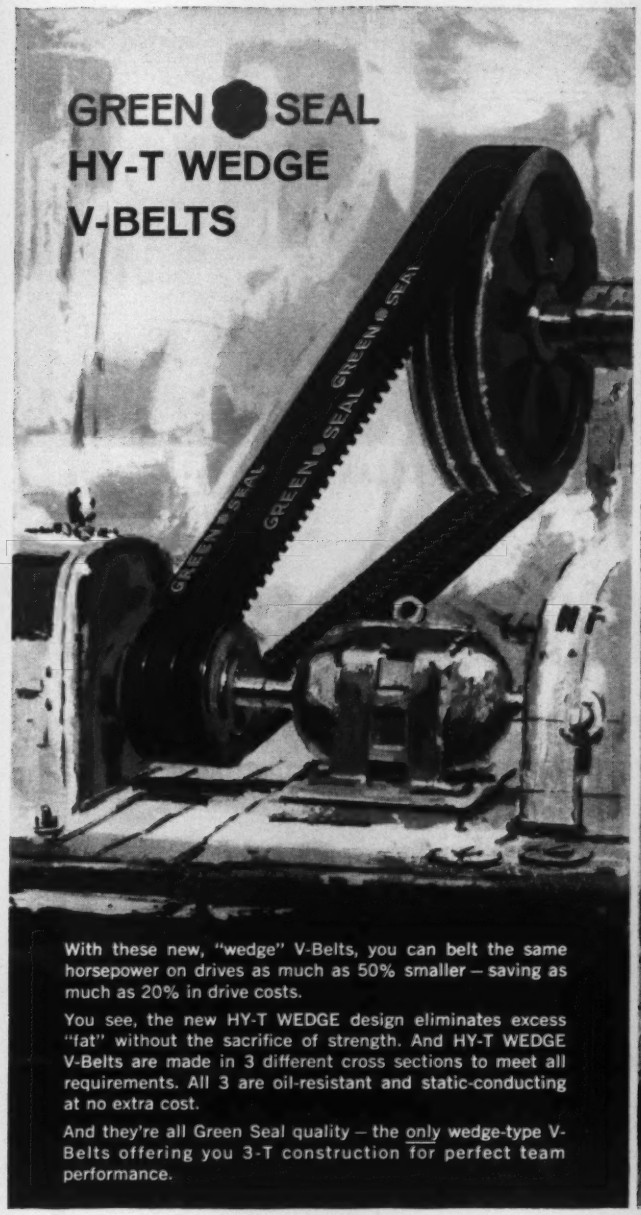
These belts stay dimensionally stable, too – no matter how long you store them. That's a big factor when it comes to stocking stand-by belts for emergency use.


GREEN SEAL
VARIABLE-SPEED BELTS
Here are variable-speed belts you can count on for controlled performance—a "must" when you're harnessing those hard-to-handle variable-speed drives.
With these belts, for example, you control the tendency toward slippage. A unique abrasion-resistant cover takes a strong, uniform grip on both sides of the sheave.
And these belts, too, use exclusive Goodyear 3-T Processed Cord for "muscles." It's your assurance of belts that won't shrink or stretch—in storage or in use.
GREEN SEAL

NO MATTER WHAT YOU'RE BELTING–OR WHAT TYPE BELT IT CALLS FOR–YOU CAN COUNT ON A GOODYEAR BELT FOR MAXIMUM, TROUBLE-FREE HOURS AT MINIMUM COST. JUST CONTACT THE

THE BIG NAME IN V-BELTS: **GOODYEAR**

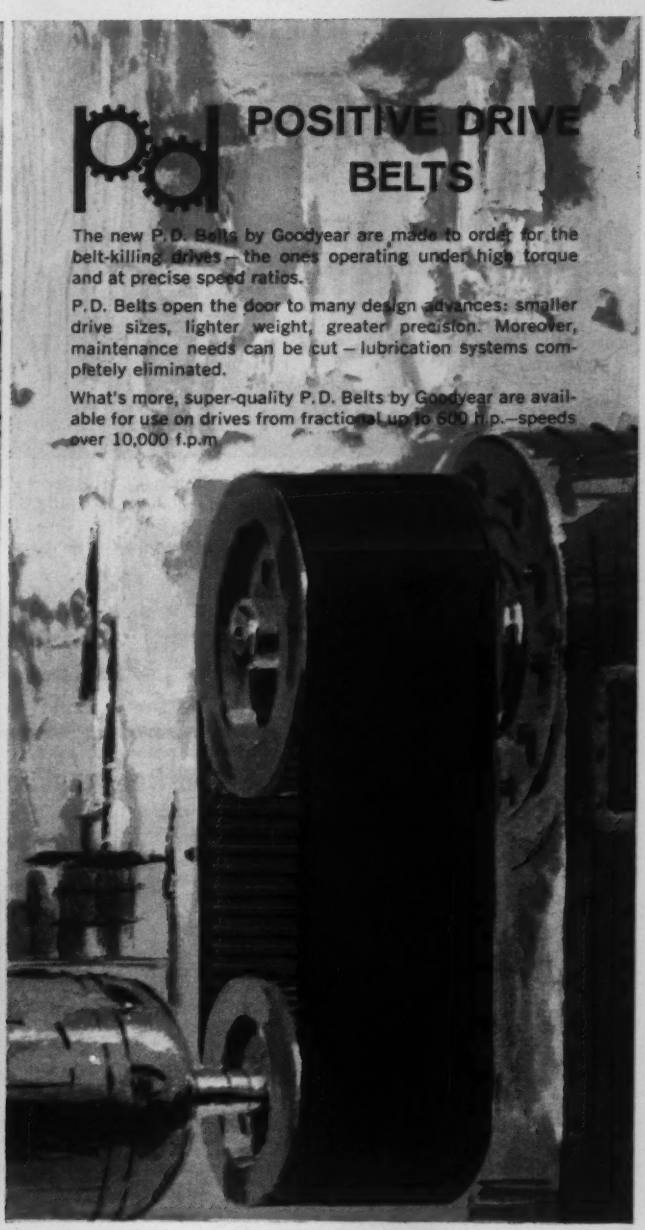
go down the line with Goodyear



With these new, "wedge" V-Belts, you can belt the same horsepower on drives as much as 50% smaller – saving as much as 20% in drive costs.

You see, the new HY-T WEDGE design eliminates excess "fat" without the sacrifice of strength. And HY-T WEDGE V-Belts are made in 3 different cross sections to meet all requirements. All 3 are oil-resistant and static-conducting at no extra cost.

And they're all Green Seal quality – the only wedge-type V-Belts offering you 3-T construction for perfect team performance.



The new P.D. Belts by Goodyear are made to order for the belt-killing drives – the ones operating under high torque and at precise speed ratios.

P.D. Belts open the door to many design advances: smaller drive sizes, lighter weight, greater precision. Moreover, maintenance needs can be cut – lubrication systems completely eliminated.

What's more, super-quality P.D. Belts by Goodyear are available for use on drives from fractional up to 600 h.p.–speeds over 10,000 f.p.m.

G.T.M.–GOODYEAR TECHNICAL MAN–THROUGH YOUR GOODYEAR DISTRIBUTOR. OR WRITE: GOODYEAR, INDUSTRIAL PRODUCTS DIVISION, LINCOLN 2, NEBRASKA, OR AKRON 16, OHIO.

YEAR

THE GREATEST NAME IN RUBBER

Green Seal, HY-T WEDGE, P.D.–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

9:47 A.M. Customer phones order to District Office.

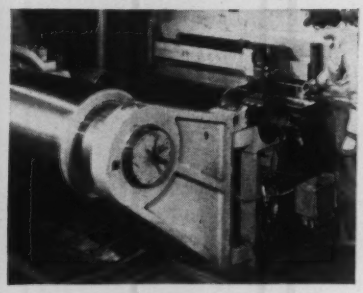
10:01 A.M. Customer's tape for the item is pulled from file. There are 10,000 customer tapes in a typical District Sales Office. Only variables are typed on re-orders.

10:30 A.M. The Cleveland Teletype Switching Center automatically relays the order to the proper service center.

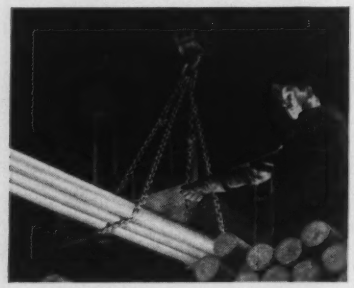
HOW REPUBLIC'S NEW "MINUTE MAN"

How Republic's High Speed Communication System Helped Three Customers

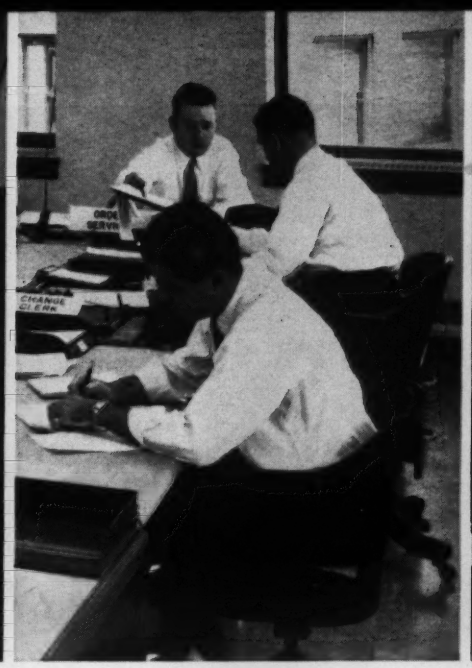
Tulsa ordered at 10:00 A.M. and Chicago shipped at 5:00 P.M. the same day. A customer's inquiry from Tulsa for oil country casing and tubing was teletyped to Cleveland at 10:07. Cleveland located the material in stock at the Chicago mill and answered the inquiry at 10:15. Forty-five minutes later the order was confirmed. The order was shipped from Chicago by 5 o'clock that same day. Just one example of how Republic's sales and production teams are keyed to solve customers' delivery problems.



"Need stainless steel in quantity, and need it in a hurry", a sink manufacturer phoned our Chicago Distributor. Approximately forty-five hours after the phone call, Republic's Massillon mill had the order of ENDURO® Stainless Steel rolled, slit, shipped, and in the customer's plant. An unusual instance? Perhaps, but it does show again, how Republic's high-speed communication system is geared to keep pace with industry's growing demands for service and quality.



From inquiry to delivery within two days. A Detroit forging customer needed hot rolled bars quickly, to fill an order. Within minutes after the inquiry, the Cleveland service center located steel billets in semi-finished form at the Buffalo steel plant. Result—the Buffalo mill received the order in detail the same day of the inquiry. The bars were rolled that night and shipped the next day. Now, knowledge of Republic mills is concentrated and available to customers within minutes.



10:38 A.M. A team of service center "Minute Men" quickly selects the right mill to satisfy the customer's specified quality and delivery.

11:30 A.M. Mill receives order containing metallurgy, shipping instructions, and all details.

SERVICE SPEEDS STEEL DELIVERIES

Fast delivery is always a point of competition among steel mills. Republic now applies automation to cut order processing from days to minutes: it reduces paper work and production time—speeds delivery. This increase in service gives Republic customers another competitive edge in today's market.

From the first click of the teletype key, Republic's sales and production teams go to work. Within a matter of seconds, customer orders can be sent from any one of 22 district sales offices to the Cleveland Switching Center. Here orders are relayed automatically to any one of six service centers where a team of Republic "Minute Men" check specifications, confirm orders, and determine mill schedules. Once the order has been processed at the service center, it is relayed automatically to the proper mill for scheduling—all in a matter of a few hours.

Installed after three years of research and development by Republic, this electronically-automated system has literally revolutionized methods and organization for processing sales orders.

In addition to speedier handling, customer specifications are filed on paper tapes for repeat order use. The possibility of error is reduced and duplication of records eliminated.

"Minute Man" service on steel deliveries is only the first step of a comprehensive program. Research and planning is under way to extend the automatic system of scheduling and processing within the plant. A battery of electronic brains will provide the statistical information needed to plan and control operations more efficiently.

Automation is but one example of Republic's continuous effort to improve customer service.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
DEPT. IA -8112
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send me more information on:

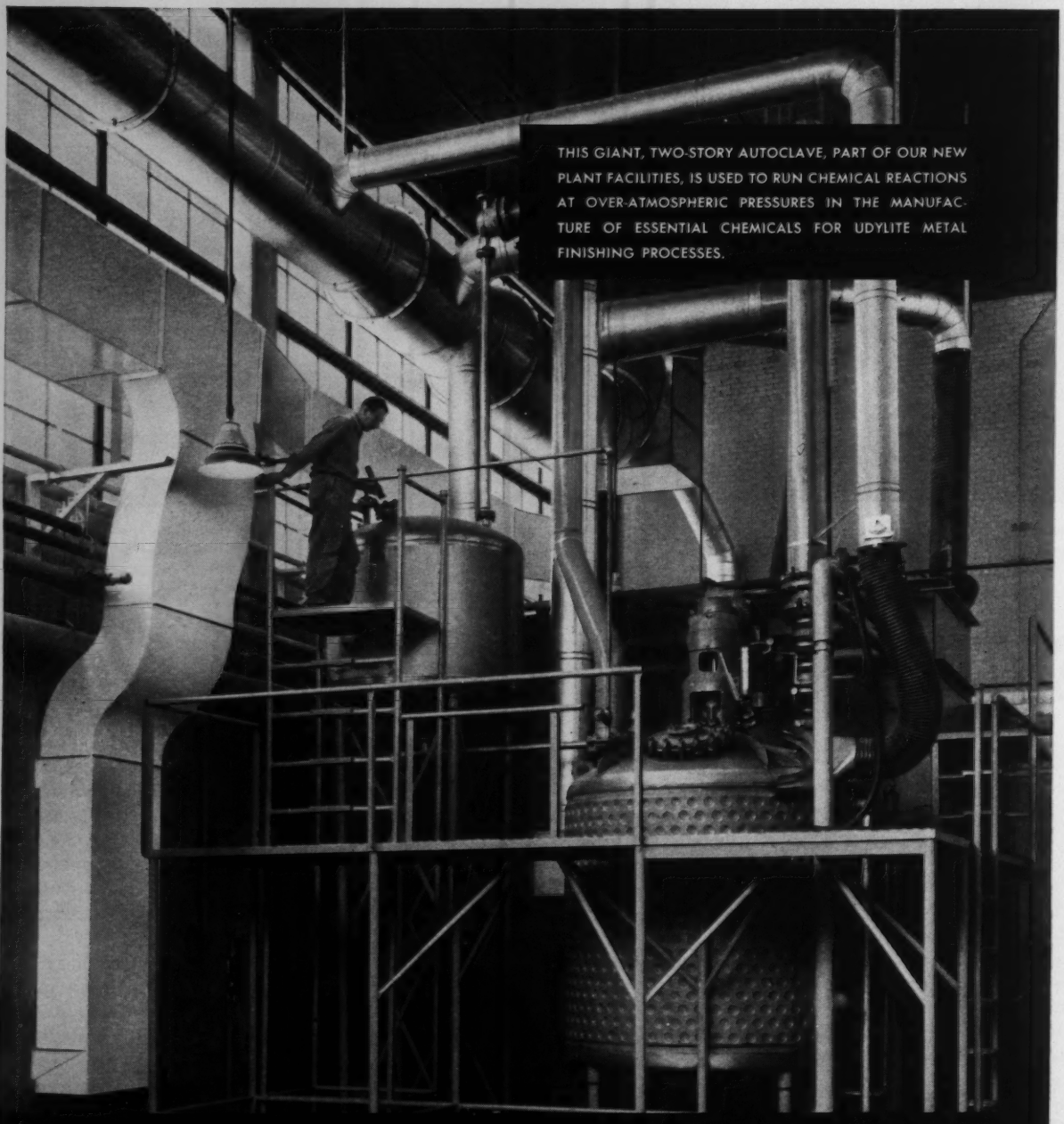
☐ Casing and Tubing ☐ Stainless Steel

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____



THIS GIANT, TWO-STORY AUTOCLAVE, PART OF OUR NEW PLANT FACILITIES, IS USED TO RUN CHEMICAL REACTIONS AT OVER-ATMOSPHERIC PRESSURES IN THE MANUFACTURE OF ESSENTIAL CHEMICALS FOR UDYLITE METAL FINISHING PROCESSES.

$600,000.00 *Invested in your future:*

It cost that much to complete additional new plant facilities at Udylite in order to guarantee you: *1*—absolute purity of product, *2*—stringent quality controls, *3*—reasonable price schedules. Now you can *depend* on these benefits from Udylite for years ahead, as our industry expands.

the udylite

corporation

Detroit 11, Michigan

on the west coast:

the L. H. Butcher Company

Forward March in 1960...

Udylite offers new products, processes

MAJOR DEVELOPMENTS IN EVERY PHASE OF THE INDUSTRY COME FROM THE WORLD'S LARGEST PLATING SUPPLIER

Udylite steps up the production of new equipment and processes and continues its expanding program of research and new product development. Here are some of the New benefit-packed innovations that Udylite has ready for you NOW.

New Barrel assembly Just released, Udylok-Tempron Barrel Assembly . . . unique interlocking cylinder construction which permits speedy field repair . . . tie-rod-free construction . . . twelve machine screws the only metal used in cylinder . . . advanced ring gear design with heavy duty, four pitch gearing for greater strength . . . longer life . . . made of non-corrosive Udylon . . . *and* a revolutionary new superstructure design.

New Rectifier line A whole new line . . . completely re-designed from the ground up . . . economies affected with new method of manufacture mean real savings in your original cost . . . keep maintenance and replacement costs minimum . . . fully guaranteed and built to usual high standards of Udylite quality construction.

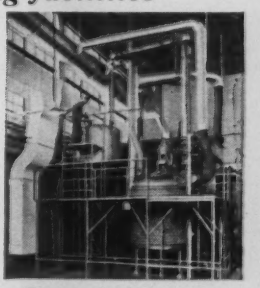
New Tank lining Brand new tank lining . . . for special applications . . . introducing a new recently perfected material of unusual properties . . . an EXCLUSIVE with Udylite.

New Filter series Improved . . . high area . . . low pressure filters . . . designed with economy of operation in mind for you . . . long range savings . . . low, low maintenance costs . . . greatly increased efficiency . . . full range of sizes and capacities.

New Processes due Another great forward step in the battle against corrosion . . . A NEW Udylite bright plate process . . . now under rigorous testing for introduction early in the spring . . . a product of the continuing research and development that gave you "The Incomparable 66" and Bi/NICKEL.

New Automatic Machine features Plating automation . . . equipment advances . . . including new skip mechanism . . . 1960 models of Cyclemaster . . . and the famous Udylite V.I.P., automated barrel plating machine . . . to fit economy budgets.

New manufacturing facilities $600,000.00 expansion program at Udylite, Detroit . . . installation permits quality controlled production of vital raw materials . . . guarantees source of supply . . . provides you with product of insured purity . . . at a reasonable price.



Giant autoclave . . . new plant facility at Udylite

The newest and the best in plating supplies, equipment and processes . . . products such as those shown here flow constantly from Udylite to industry. Watch for detailed announcements every month. If you'd like to learn more about any of the developments we've talked about right away, just get in touch with your Udylite man today or write to:

the udylite corporation • Detroit 11, Michigan
world's largest plating supplier

on the west coast the:
L. H. Butcher Company

Which OXYGEN STEEL-MAKING

Higher quality, less costly steel is being produced today through a more effective use of oxygen in several new steel processes.

Which of the processes is best for *you?* Or are you considering oxygen enrichment for existing open hearths or blast furnaces?

For your oxygen requirements, American Messer's broad experience in the design and construction of bulk oxygen plants for steel mill applications is at your service.

Messer can work with you to install an oxygen system properly tailored to your own requirements—to make sure your operation is the one ideally suited to increase tonnage and improve the quality of your production.

With seven tonnage oxygen plants now serving the steel industry and two currently under construction, *you* can profit from Messer's oxygen know-how in the modernization of your steel facilities. Write or call American Messer today for full information.

AMERICAN MESSER

CHRYSLER BUILDING • 405 LEXINGTON AVENUE

PROCESSES Are You Considering?

WHATEVER
YOUR CHOICE–
CONSULT
MESSER FOR
OXYGEN
SYSTEMS

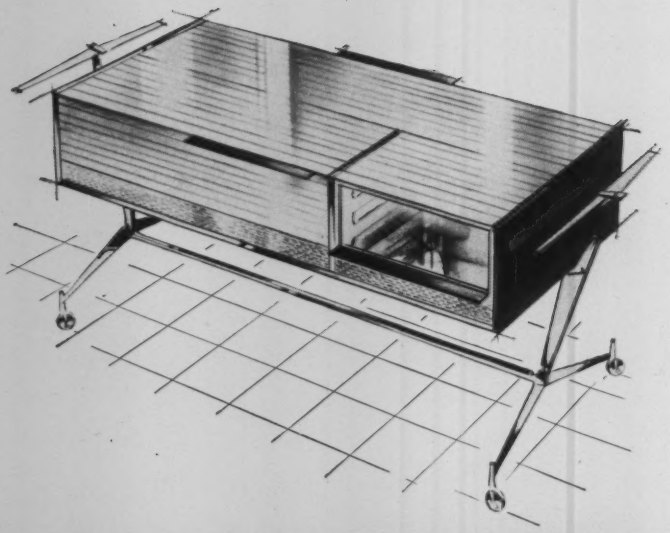
CORPORATION

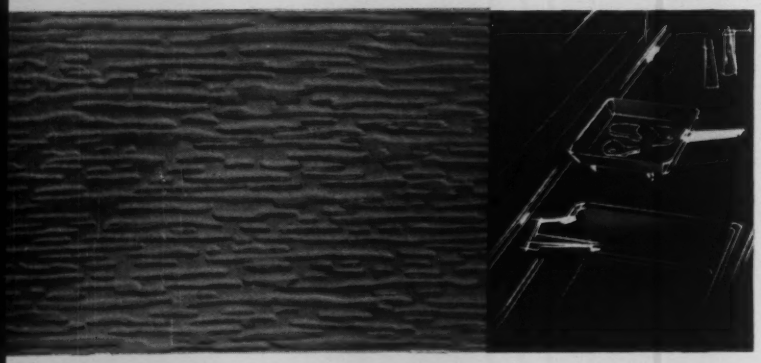
NEW YORK 17, NEW YORK

Carl Sundberg and Montgomery Ferar joined fortunes in 1934 and since have had a great influence on improving the design of mass-produced consumer and industrial products.

One of the largest of the nation's recognized design firms, they have put their talents to work on hundreds of nationally known products ranging from pencil clips to heavy-duty motor trucks and electronic computers. Recognized leaders in the design of electrical appliances, they are permanently retained by many of America's best known appliance manufacturers.

Sundberg-Ferar designs a unique, portable kitchen caddy with wonderful...



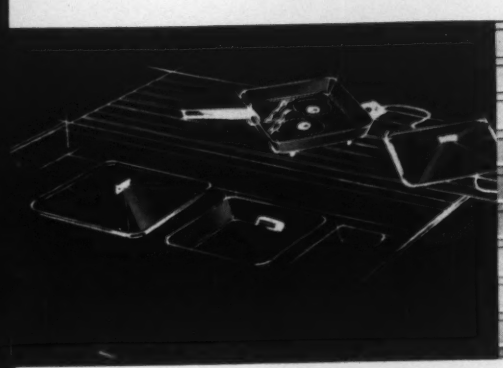


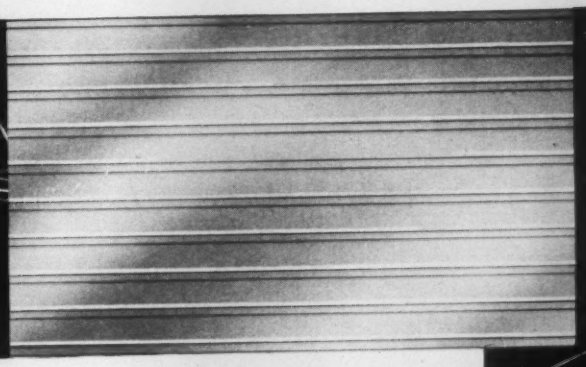
• Sharonart® is truly the designer's metal. Evidence of this fact is this modern kitchen caddy designed in Sharonart® by Sundberg-Ferar, one of the oldest, largest and most successful industrial design firms in the United States.

The portable caddy permits complete cooking facilities anywhere inside or outside of the home. To make sure it would be able to absorb the punishment of daily use, yet stay bright and clean, Sundberg-Ferar designed the cabinet and working areas in patterns of Sharonart® Stainless. Wood grain Sharonart® steel panels at each end give the furniture-look that blends with other home furnishings.

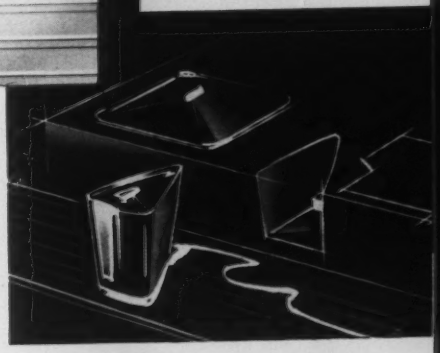
The textured beauty of Sharonart® can be produced in an almost limitless number of patterns. This permits easy model changing. It's easy to clean and will not show wear. It can be painted, plated, or vinyl coated with beautiful results. Is it any wonder that more and more of the leading designers are turning to modern Sharonart® for modern product design? *Sharon Steel Corporation, Sharon, Pa.*

About the portable kitchen caddy: This is a design only, produced to show the tremendous utility of Sharonart®. All the seemingly built-in utensils are self-energized, and can be plugged into any electrical outlet as well as being used with the caddy itself. The rotisserie has vertical elements that can be moved closer together for the smokeless vertical broiling of steaks. All utensils are removable and can be used at the dinner table for gourmet cooking. Plenty of workspace is provided for complete meal preparation right at the caddy.

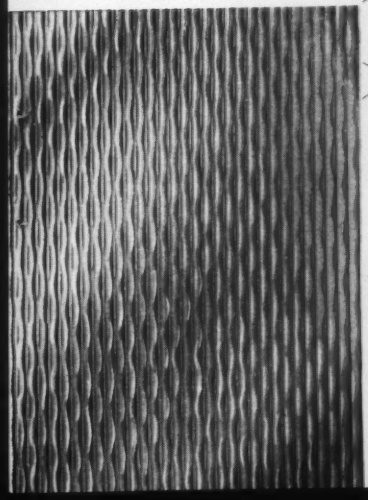




Steel



..SHARONART®

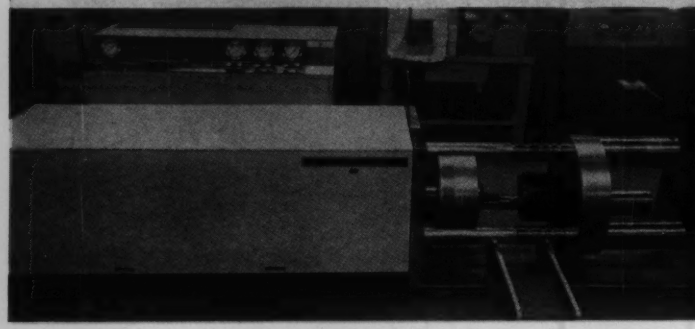


SHARON *Quality* STEEL

SHARONSTEEL

EVIDENCE

▶▶ *Here is clear evidence that high velocity extrusion of metal has dispersed stringy non-metallic inclusions. The part pictured is a hinge pin for* USAF's *B-58 Hustler. The pin on the left was machined from* AISI *4335 modified bar stock. The clearly visible inclusions made the part unfit for service. The pin at the right is made from the same material, but only after it had been extruded at very high velocities by a* DYNAPAK *machine. The inclusions have been eliminated. The part is completely satisfactory. There is no need to change to a more costly metal, or to resort to special mill heats.*



Pneumatically energized DYNAPAK, a product of General Dynamics Corporation, is industry's first practical tool for high-energy-rate metalworking. Many industries are now adapting DYNAPAK to the solution of forging, forming, and extrusion problems. The experience of Convair Fort Worth with these hinge pins gives evidence of another of DYNAPAK's advantages. The hydrodynamic behavior of metal when it is worked at DYNAPAK velocities results in homogeneity and refinement of structure and in dispersal of inclusions.

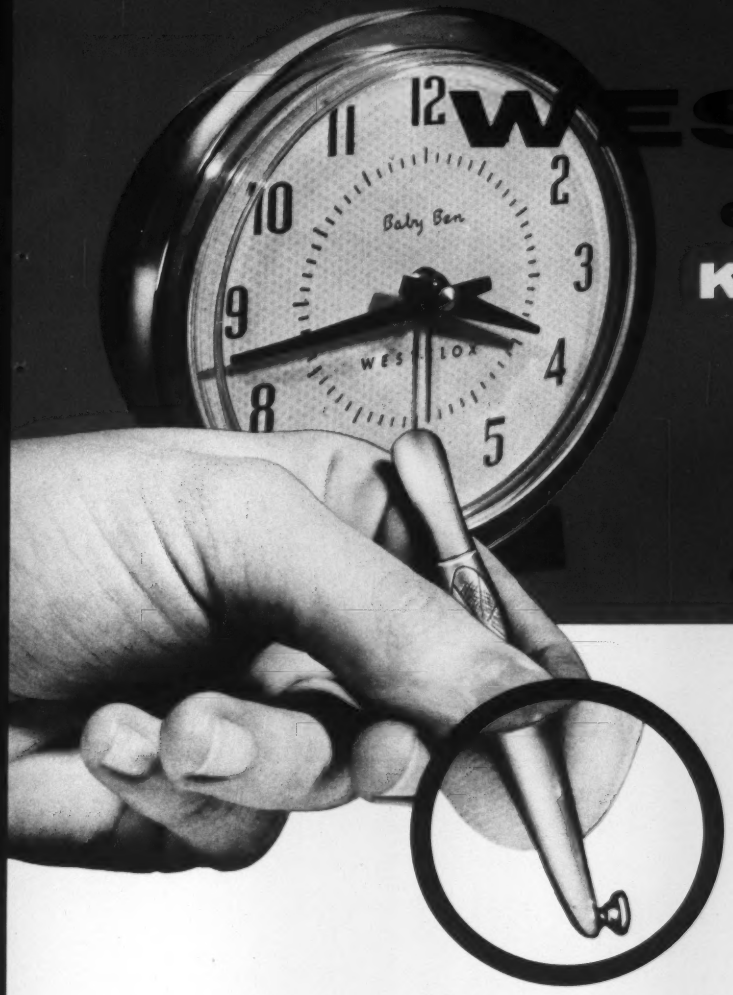
for complete information, write, wire, or phone:

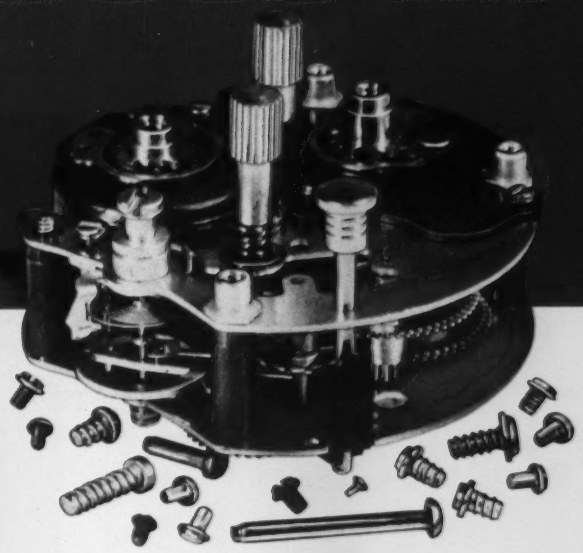
DYNAPAK

CONVAIR / A DIVISION OF GENERAL DYNAMICS CORPORATION

1243 Transit Avenue, Pomona, California • Phone: NAtional 3-1561

WESTCLOX extends die life with KEYSTONE WIRE





From precision parts—such as these fasteners made from Keystone "XL" Wire—come the quality that has made WESTCLOX the most famous name in timepieces.

The Westclox Division of General Time Corporation, LaSalle, Illinois, is the world's largest manufacturer of timepieces. For years, millions of their famous Big Ben and Baby Ben clocks have started the day for more people than any other timepiece.

Keystone "XL" Wire has played a key part in "clockwork" cold heading of the millions of tiny fasteners—rivets and screws—that are a part of the "works" inside. From small .032" to .116" Keystone wire, some 170,000,000 fasteners are headed in a year. Precision of such tiny parts is important for high-speed assembly of quality timepieces.

Fifteen years ago Keystone metallurgists were called in at Westclox . . . analyzed wire use . . . die design . . . and recommended a wire that solved an excessive die wear problem. Today, one special carbide die at Westclox has headed an estimated 4-million parts . . . and is still in use after 12 years of operation. Keystone "XL" Wire is the big favorite on Westclox fastener heading today.

The *flowability* characteristic of Keystone "XL" Wire is the secret of success . . . it's a wire that practically "flows" through dies to form the most extreme shapes . . . with less die wear . . . greater precision . . . reduced waste.

Want a Keystone Wire Specialist to help you save money and improve quality? Write for details!

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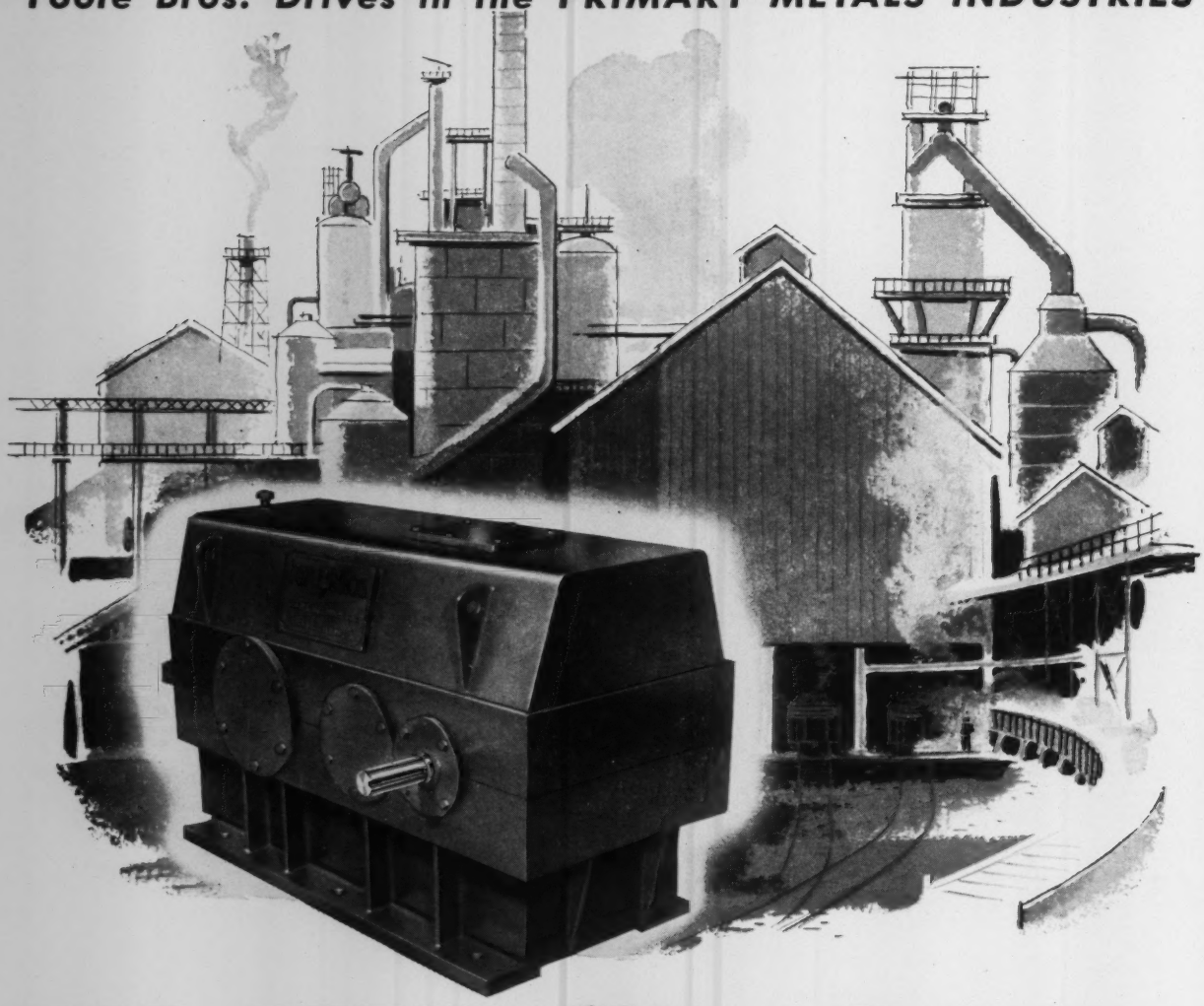

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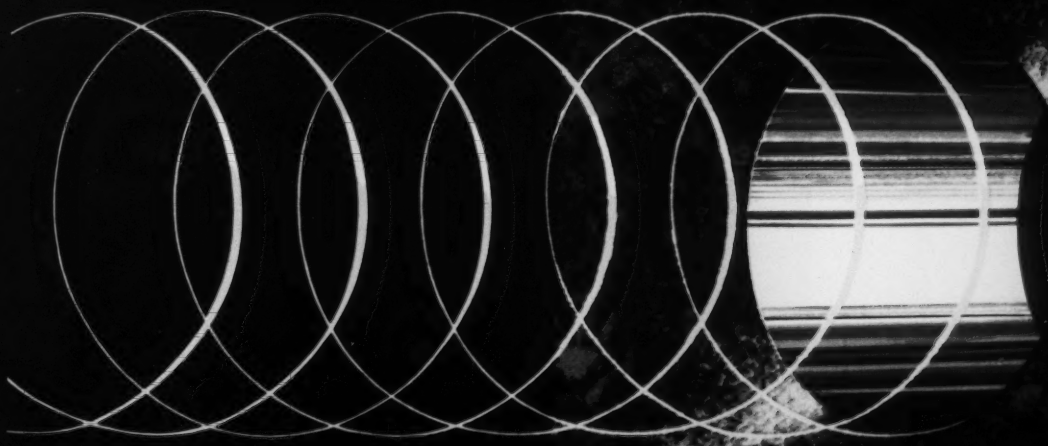

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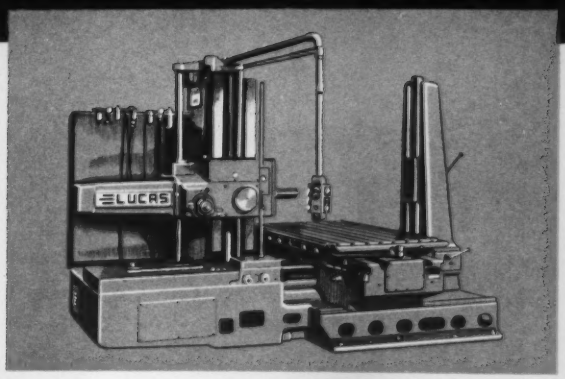

LUCAS
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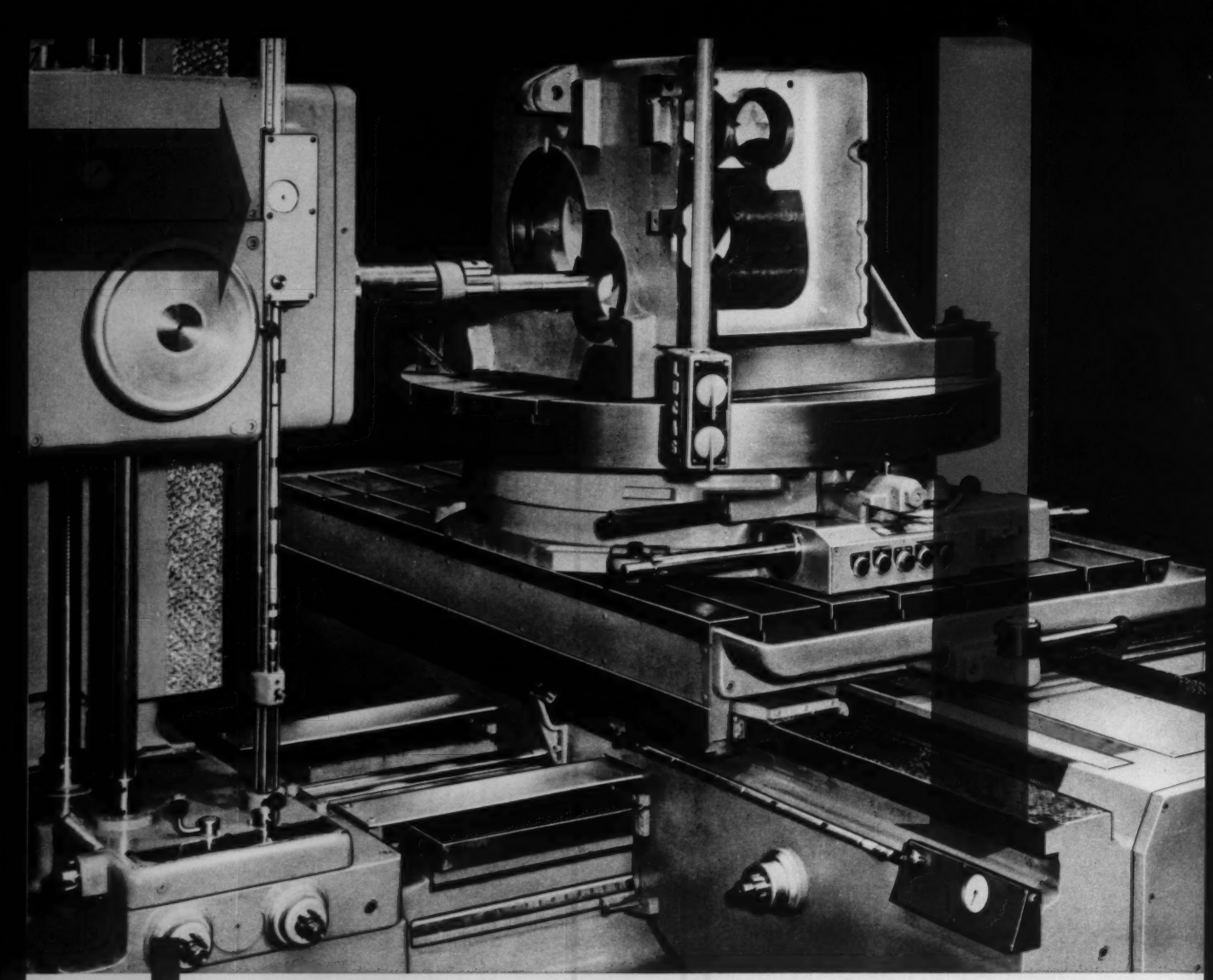

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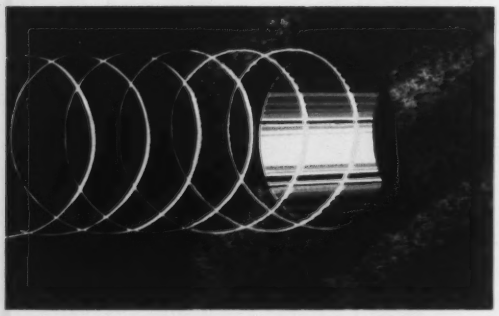

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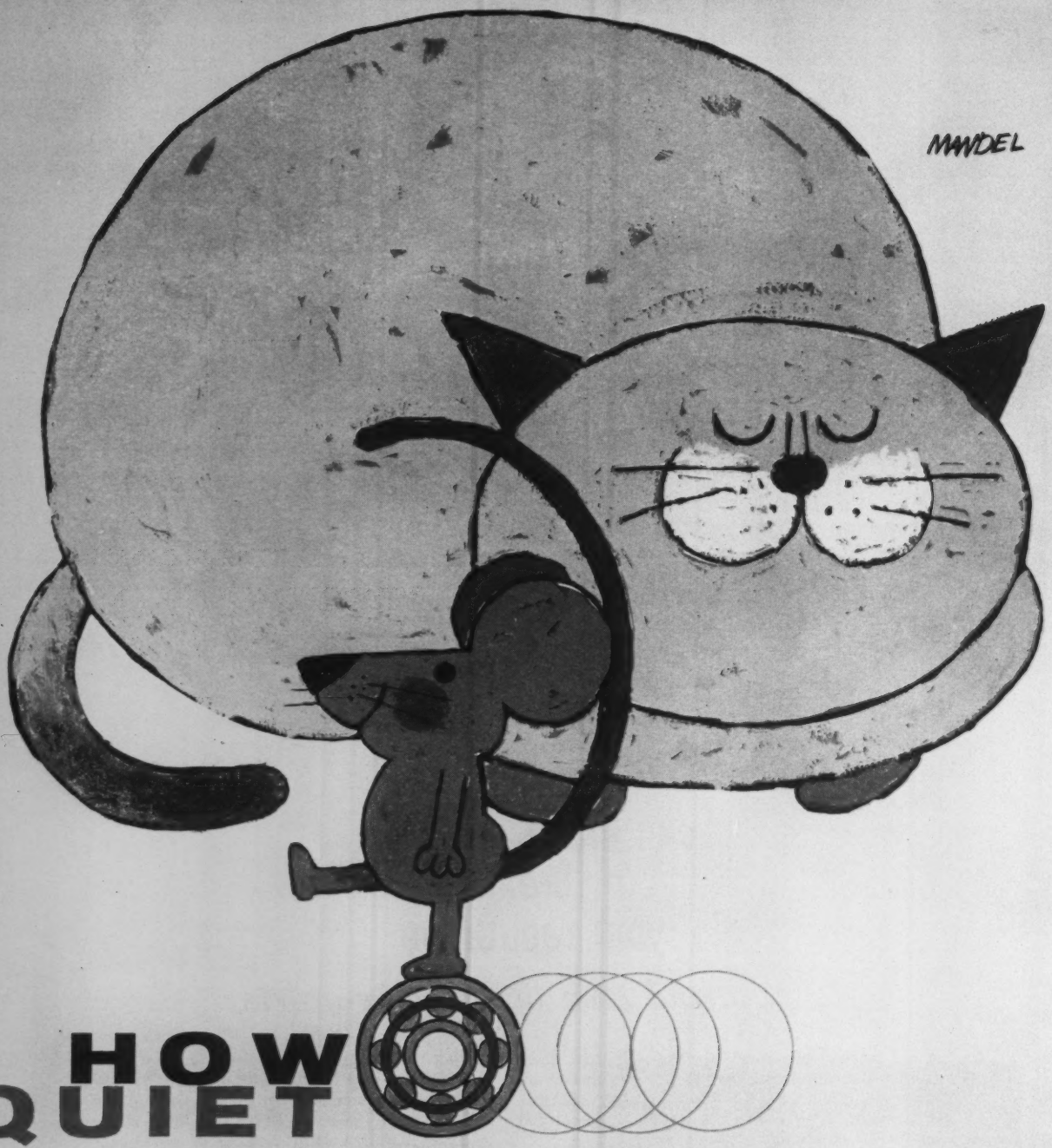

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PLANT AND EQUIPMENT SPENDING should stay high throughout most of 1960. Metalworking boosted capital appropriations some $275 million in fourth quarter '59. The $1.3 billion total set aside for capital goods in the fourth quarter runs 56 pct higher than a year earlier. Since appropriations lead order placing by six to 12 months, the 1960 spending outlook is strong.

POSSIBILITY OF EASIER CREDIT is an important factor to consider in market planning for the rest of the year. No radical easing is expected, but an easier flow of credit should help pick up spending this spring.

A LARGER NUMBER OF MIDDLE INCOME families is going to help consumer durable sales in both the long-term and short-term. With more families in this group, the amount of money available for discretionary spending is increasing. This means less tendency to defer buying of these "easily deferable" items.

GREATER USE OF NONFERROUS PARTS in the auto industry can be expected to boost the use of industrial adhesives. With more aluminum and magnesium parts, more structural adhesives will be brought into use. One advantage: Possible use of lighter gage materials.

MISSILE-BUILDING SPEEDUP IS ABOUT READY for launching. Pentagon brass is asking the White House to approve an extra $400 million for an 18 pct boost in the planned force of Atlas and Titan missiles. But if the Administration asks for more, Congress can still be expected to raise the ante.

BUSINESS INDICATORS CONTINUE HIGH, but some evidence of cross-currents is beginning to show. The Index of Industrial Production declined one point in February from January's record. But unemployment defied seasonal factors by declining.

GREATER INTEREST IN COLORED METALS is stepping-up drive among manufacturers to produce better-looking, more durable finishes. Advances are coming from makers of sprayed vinyl coatings, anodized aluminum, porcelain enamel, and paints.

PIG IRON FORECASTS HAVE BEEN REVISED sharply downward in the last 30 days. 1960 production will run below 1959 by several percentage points, according to new estimates.

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Growing Market Demand Brings Metal Coloring Advances

Wider use of colored metals is promoting development of more durable, better looking finishes.

Technical advances are coming from makers of sprayed vinyl coatings, anodized aluminum, porcelain enamel, and paints.—By F. J. Starin.

■ Just a little over a year ago a major architect, hired to design two new office buildings in New York, talked with the builder about hiring a color consultant.

His argument: "There is a definite need to bring harmony to the area, so that one building will have a pleasing relationship to the other."

But another of his reasons was "the tenants have stressed the need for color in design."

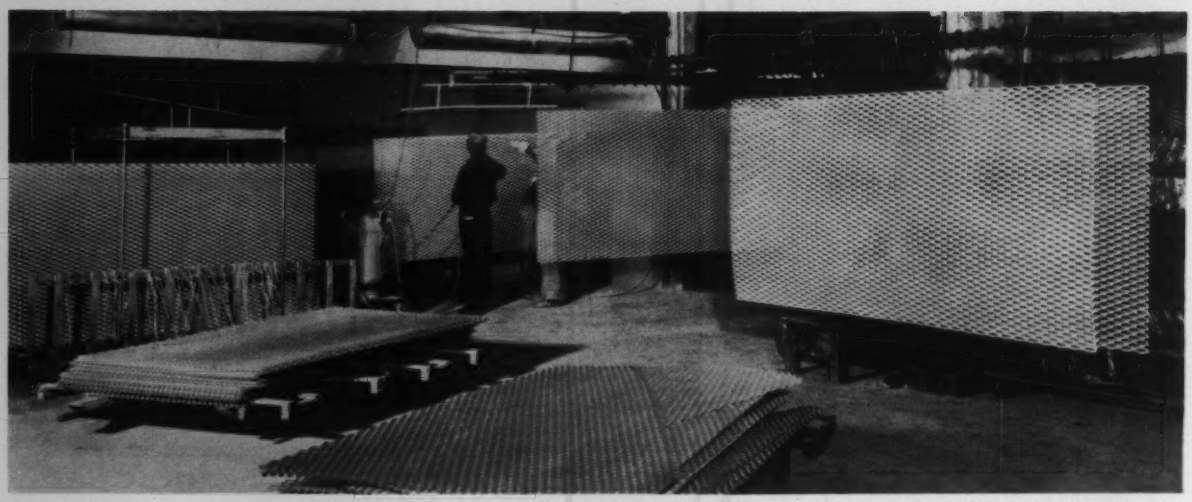
Colorful Kitchens — Primarily because of this pressure from the consumer level, the use of color in metals has been mushrooming in the last few years. Howard Ketcham, the color engineer this architect had in mind, points out almost half of all steel kitchen cabinets now sold are in color. And, he says, the demand is still rising.

The immediate, direct result of this boom for color has been tremendous technical advances in ways of applying color and improvement in the durability and appearance of color. These are sharply changing the structure of the market.

Advances in Vinyl—One of the biggest new factors, which has yet to make its full impact, is sprayed vinyl coatings, developed by Metal & Thermit Corp., New York.

Vinyl was first applied to metal in the early 1950's by lamination. But this was only effective on flat surfaces. And it was expensive because it was applied by hand. The next major improvement was development of techniques for continuous roller application. This cut costs by about 20 pct over lamination.

M&T's system applies colored vinyl by standard spray equipment. It can be applied to odd shapes and sizes and to varied metals. Coating thickness can be closely controlled. And it can be applied to textured



COAT, THEN FIRE: Expanded metal sheet receives porcelain enamel coating before firing process begins.

metal without distorting the pattern.

Advantages Listed—Donald W. Oakley, vice president of M&T, and general manager of its coating division, says vinyl coatings have excellent corrosion resistance, and are tough and resilient with high resistance to scratching, scuffing and abrasion. In addition they are chemically inert, odorless, and highly resistant to acids and alkalies. And, the range of colors is almost limitless.

He calls the potential market "staggering." Another trade source says with some cost improvements the annual market could amount to as much as one billion square ft.

New developments in color anodizing aluminum don't have quite the endless color possibilities. But they offer more color stability and durability than previously possible.

Color Improvements — Several companies have been working to improve coloring. The latest improvement comes from Kaiser Aluminum & Chemical Co. The company says its new Kalcolor does away with standard organic dyes. It says lasting tones are created during anodizing "through conversion of alloying elements within the metal itself." And, says Kaiser, "since tones in the coating result from a reaction of alloying elements within the metal to the new anodizing system, excellent color uniformity is achieved from one batch to the next."

The technique, which has been worked on at Kaiser laboratories at Spokane, Wash., for four years, was developed specifically for use with architectural alloys available as extrusions, sheet, and castings. Colors available are gold, amber, tan, brown, olive, gray, and black.

The company says the Kalcolor system has been thoroughly proven by extensive tests—15,000 hours of salt spray, 7000 hours of water fog, and three years of high intensity ultra-violet rays.

Other aluminum companies are working along similar lines. One is experimenting with multi-color finishes, rolling and forming directly from powder.

Enameling Progress — Porcelain enamelers, who once had the field of color in metals almost to themselves, have not been standing still. But their biggest strides in the last few years have been in cutting costs.

One new technique is to use premium grades of enameling steels, or special cleaning and pretreatment of sheet iron allowing the color finish to be applied in one coat. The reduction in the overall coating thickness improves resistance to mechanical damage and thermal shock, say enamelers. And production costs are cut with the elimination of a ground or base coat.

Costs Cut—One major enameler says use of non-premium steel cuts costs by about $10 per ton for material. This, he says, lets porcelain enamel compete on price with paint in some areas.

The importance of color in the porcelain enamel industry is well demonstrated by the index of net shipments put out by the Porcelain Enamel Institute.

Shipments in 1947-1949 are the base of 100. Overall shipments grew from 106.6 in 1947 to 155.6 in 1959. But architectural shipments where color has made the greatest impact, went up from 42.2 in 1947 to 1634.7 in 1959.

Paintmakers Active—The paintmakers have also been very active in the last few years. A good example is the modified acrylic paint used on the new Four Gateway Center Building in Pittsburgh. While the paint is gray, it could have been in any one of 10 other colors. In fact, D. I. Brown, assistant to the president of Washington Steel Corp., one of the companies involved in developing the paint, predicts Four Gateway Center will be "a showcase for the use of colored stainless steel."

Owner-Management Background Works Against Small Suppliers

By Z. S. Malinowski and W. N. Kinnard, Jr.

Many job shop problems stem from the characteristics of the owner-manager.

He is usually strong on production, but weak marketing, finance, and management.

■ Clustered around the large centers of manufacturing can be found a satellite industry of metalworking suppliers.

They face many common problems in their struggle for survival. Many of them are inherent in the nature of the business: Dependency on a few customers, preoccupation with the small run, and similar characteristics (The IRON AGE, March 17, P. 68).

Owner - Manager — But other problems stem from the characteristics of management that are as universal in the industry as those of economics and production. These generally stem from the problems of single ownership, where the owner is also the manager of the company.

As a result, the owner is personally involved financially in the fortunes of the business. He is dependent on the firm for his income. And the firm is dependent on the owner for capital funds. It is in this dual role of owner-manager that many of the management problems arise.

The top managers of these metals service shops, or job shops, are usually craftsmen who have been employed in a large metalworking firm in the same area. They probably struck out for themselves as suppliers to, or in direct competition with, their former employers.

In their own shop, these men double as operators. The burden they assume is tremendous since they are already overloaded with management responsibilities.

Personal Identification — The owners tend to identify themselves intimately with their business, whether it is incorporated or not. One result is the tendency to reinvest all earnings beyond personal salary and expenses. Because of this, few owners develop adequate estates outside of the business itself.

Owner-Manager Problems

Part II

This is the second of a two-part series by Drs. Malinowski and Kinnard of the U. of Connecticut. It points out characteristics of the owner-manager, and how they affect overall operation of the small metalworking supplier.

No Interference—Since the company is his, the owner-operator does not mind reinvesting earnings as long as the company needs them. Salaries, bonuses, and dividends are hopelessly intermingled and reported profits of the firm may be meaningless.

This identification, this heavy personal and financial involvement, is undoubtedly a major factor in the reluctance of these owner-operators to relinquish control and to share profits.

Usually, the owner's only provision for retirement that is not contingent upon sale or continued success of the firm is Social Security. However, some means of disposing of shares of ownership during his lifetime is rarely developed.

Board of Directors—The small operator is reluctant to relinquish his control of the business. He is usually the founder and has an understandably strong proprietary interest. For this reason, he prefers to borrow money at interest, even though this may be more expensive, rather than share control and profits in order to obtain equity capital.

This reluctance to relinquish control in the case of incorporated companies limits the usefulness of the board of directors.

Management Skills Needed—As noted in Part I, owner-operators are essentially technicians. They are able to enter this industry because they are technicians and it is the unusual man who has the requisite financial and other managerial skill to combine with this technical skill.

As a result, financial planning much beyond the next payroll rarely takes place, unless it is forced on the firm in quest of outside funds.

Sometimes the low regard in which these technicians hold managerial and financial skills is as disruptive as managerial and financial inability. The majority of operators recoil at the thought of being managed by people who are not technically competent.

Other Influences—These are the personal characteristics of the owner-manager and how they influence the management of the small metalworking supplier. But the owner-manager characteristic has other deep influences on the management of the small firm.

One important aspect is the

Characteristics of the Owner-Operator

Remains a Technician and Operator

Technical background makes him production-conscious. He often works in the plant although over-burdened with management problems.

Identification with the Business

This follows naturally from the dual role as owner and manager as well as founder of the business. Personal finances are intimately tied to the fortunes of the business.

No Provision for Disposition of Shares

Only retirement means is usually Social Security. A method of disposing of equity shares is rarely developed.

Capital Gains by Sale Not a Goal

Most owners recognize importance of capital gains, but few have sale for capital gain as a conscious goal. Many hope their sons will take over the company.

Non-Technical Skills Disparaged

Owners undervalue importance of administration, finance, marketing. They cannot tolerate control by those who are not technicians.

questionable marketability of the average small supplier firm. The company is usually dependent on the technical knowhow or other special assets of the one or two primary owners of the business.

Market Value—Obviously, such strong dependence upon one or two owner-operators reduces the marketability of the firm, since continuity depends on the one or two men. For example, one sole proprietor claimed he made all of his real profits by knowing how to set up his machines for accelerated production of certain machine parts. Without his personal technical ability, he maintained, his firm was worth only the current market value of its 12 to 15 machine tools.

Creation of a going-concern value apart from the owner is a major goal of many of these firms. Not only does it indicate the market's appraisal of the firm as a success, but it permits the transfer of ownership to achieve a capital gain.

Standard Item Wanted—Production of a standardized item is a goal of many of these firms in order to reduce risk and increase the marketability of the firm. This will give the firm an identity apart from that of the owner. But with limited funds available for development and research, only a few of the firms in this group are able to develop and introduce such a product.

Two additional factors hinder an equitable sale of shares of ownership in these small businesses: The lack of any active market appraisal, and the unrealistic financial statements.

Expense Accounters—Moreover, with little or no pressure from outside stockholders to make favorable earnings reports, some owners find no brake, except the legal one, to expensing all they can get away with.

There are two aspects of expensing that should be distinguished: (1) The expensing of personal activities of the owner; (2) expensing and rapid depreciation of tools and equipment.

The practice of expensing and depreciating as much as possible has serious drawbacks when the firm tries to raise equity capital or to dispose of shares of ownership.

Production Oriented—The characteristic of undermanagement also stems from the fact that most small supplier firms are one or two-man operations. The background of most of these men is generally production and engineering. They are not administrators. They know little or nothing about finance, marketing, accounting, personnel, purchasing or statistics.

The result is a general lack of long-range planning, a neglect of selling and advertising, and a tendency to over-indulge in the daily problems of production.

Succession Problems — Another problem is inadequate provision fot management succession. In case of retirement or death, management succession is complicated by lack of market appraisal of the firm, unrealistic financial statements, and dependence upon the owner's personal know-how for continuity of the firm.

In some shops, managers want their sons to take over from them. This, however, makes it difficult to attract good second-line managers, with a resulting increase in undermanagement.

A final characteristic of the small metalworking supplier is the dependence on intimate relationships. These firms are heavily local-market and customer-oriented. Service, in this industry, means close personal contact, knowledge of men in the industry, and knowledge of details of the customer's business.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Is Materials Progress Too Slow?

New Power Sources Await High Temperature Materials

Many developments are often technically possible long before they are commercially feasible.

For example, new ways to generate electrical power must wait for new high temperature resistant materials. — By G. J. McManus.

■ Is materials development keeping pace with general technical progress?

This question was spotlighted last week when Westinghouse Electric Corp. showed off new research projects in the power generation field. Four new generating methods were displayed at the company's research center near Pittsburgh.

The methods change stored energy into electrical energy with a minimum of intermediate conversion. Direct routes give a potential advantage over standard generators, which go through thermal and mechanical stages.

No Moving Parts—In addition, all four methods work on a static principle; there are no moving parts. This makes for quiet, reliable service. It permits relatively light and compact construction.

These and other properties have stirred the interest of the electric power industry and military departments. Development work is getting a strong push. But before the full potential of these methods can be realized, new and better materials must be found.

"Now the major problem we face in direct conversion is that of the right kinds of materials to operate at the elevated temperatures which characterize these systems," says Dr. J. A. Hutcheson, engineering vice president at Westinghouse.

Scores a "First"—A look at the new systems shows why materials problems are so critical. Westinghouse demonstrated a unit which it calls "the first magnetohydrodynamic (MHD) generator of appreciable size to steadily produce electric power from the combustion of a conventional fuel."

The MHD generator passes super-hot gas at high speed through a magnetic field. In effect, the gas takes the place of an armature in a conventional power generating system. Electrons pick up a charge from the gas.

This model is designed to operate at 5000°F. Gases travel about three times the speed of sound. In tests so far, the unit has produced 2.5 kw and run continuously for four minutes.

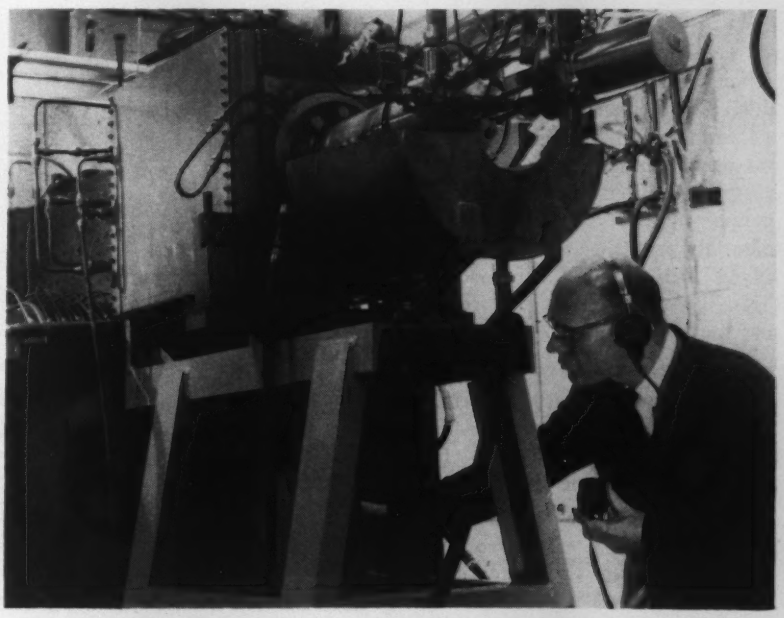
Breakthrough Needed — A 100-megawatt generator would apply the same temperatures to a space 3 ft across and 60 ft long. Power plant work, for which MHD is designed, would call for these dimensions and would require sustained operation.

"It will require a real breakthrough in materials if we are ever to have an MHD power station," says Dr. Hutcheson.

Thermoionic generators are another promising development with materials problems. In this system, a cathode is heated and electrons flow across a vacuum to an anode. The cathode material must have the proper electrical properties and must take sustained temperatures up to 4500°F.

Solid Conductor — The model demonstrated by Westinghouse was big enough to run a small electric motor. A 100-megawatt generator would have a cathode area extending over 10,000 sq ft.

Thermoelectric generators are similar except the electrodes are connected and the electron transfer is through a solid conductor rather



FUTURE POWER SOURCE: This magnetohydrodynamic power generator, built by Westinghouse Electric Corp., is the first to operate in the kilowatt range for a sustained period (four minutes).

than a vacuum. A large scale power station built on this principle would operate at 2000°F.

Westinghouse says the materials for such a station will have to be developed. However, smaller units are already being built and tested for Air Force use. The company has a contract for 500-watt portable units and is building a 5000-watt generator as a shipboard prototype.

Fuel Cells—The fuel cell is similar to a storage battery except "it consumes a low-cost fuel and an oxidant that are continuously fed into the system." Chemical reaction converts energy directly to electricity, making for a high degree of efficiency.

For economical use, it is believed the fuel cell should operate at 1800°F. Highest temperature for a steam turbine system is 1200°F. Special requirements of electrolytic materials are probably more critical than temperature in fuel cell applications.

Efficiency Experts — Despite all these difficulties, Westinghouse is optimistic about the future for new generating systems. Dr. Hutcheson points out they have potential for cost savings.

A modern steam generator is about 40 pct efficient. Fuel cells are rated at 75 pct to 90 pct efficiency. And the ultimate efficiency of MHD systems is placed at 60 pct.

In addition, the new systems offer promise in military, space and nuclear applications. For broad commercial application, however, the materials problems will have to be solved. Answers are being sought through work with ceramics, refractory metals, and semiconductors.

It All Depends—How soon any or all of the four direct conversion methods — magnetohydrodynamic, thermoionic, thermoelectric, fuel cell—reach the point of commercial feasibility depends on work in the laboratory.

Not only must the materials be able to withstand high-temperature operation for extended periods, but they must also possess necessary electrical properties.

Tiny Printed Circuit Wins Annual Award

■ A new method of forming printed circuit patterns containing passive circuit components was judged the winner of the 1959 Miniaturization Award.

Developed by David A. McLean, component development engineer, Bell Telephone Laboratories, the method greatly increases reliability of the circuit and at the same time allows considerable reduction in size.

Big Advantage—One of the most significant advantages of the method is that by making its high-quality capacitors from a single metal (tantalum) the number of manufacturing operations are cut down considerably.

The award, a bronze sculpture representing an abstract for the concept of miniaturization, was presented to Mr. McLean at a dinner March 20 at the Waldorf-Astoria Hotel, New York City.

The Award—The annual award was established in 1957 by Miniature Precision Bearings, Inc., Keene, N. H. Its purpose: To recognize outstanding miniaturization achievements, increase public knowledge of accomplishments in the field and the growing importance of miniaturization to products of everyday living and to national defense needs in the space age.

Certificates of excellence were also awarded to 10 nominees for contributions to miniaturization.

The Judges—Judging was done by an eight-man committee representing industry, research, education, government, and press.

LITTLE WINNER: David A. McLean, component engineer, Bell Telephone Laboratories, looks over his winning entry of the 1959 Miniaturization Award. He developed a method of forming printed circuits which have greater reliability and are easy to manufacture.

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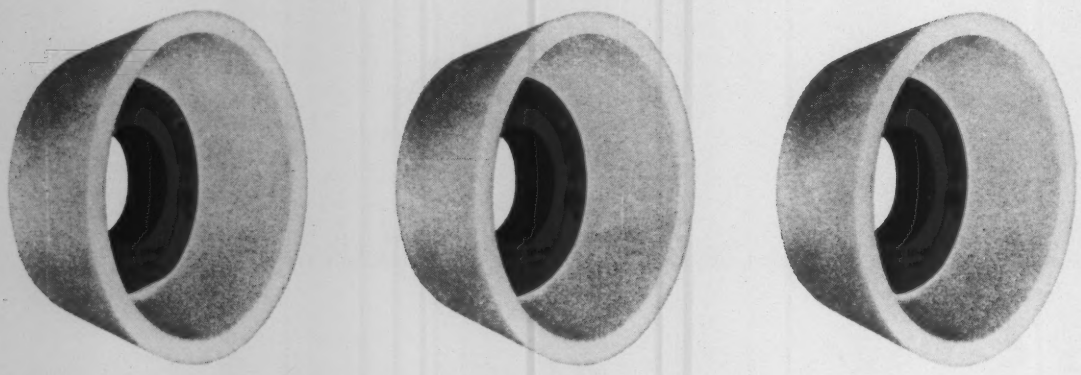

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To supply you with wheels of uniform excellence, Cincinnati's unique Ⓟ manufacturing process is unvaryingly regulated by 36 separate quality controls. For example . . . Humidity and temperature of the Wheel Mold Room are kept at the same levels every day throughout the year—an essential safeguard of Ⓟ uniformity.

RESULT: DEPENDABLE PERFORMANCE

Each Ⓟ reorder wheel gives you exactly the same good job as the original. Production goes up and stays up. Costs go down and stay down. This is the promise and performance—of Positive Duplication.

CALL CINCINNATI TODAY

Solve your grinding problems with the help of Cincinnati's factory-trained specialists. Their wide experience in job set-ups and grinding operations is at your service. Just call your CINCINNATI Ⓟ GRINDING WHEEL Distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

PD POSITIVE DUPLICATION

CINCINNATI GRINDING WHEELS

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Ready for Red Alert

UNDERGROUND: An employee of Jones & Laughlin Steel Corp. prepares to file important company records in the firm's emergency headquarters vault 150 ft below ground surface. The vault is a part of J & L's emergency setup to be used in case of nuclear attack.

Emergency Quarters Set Up by J & L

In the event of an enemy attack, personnel and records of Jones & Laughlin Steel Corp., Pittsburgh, will be well protected.

In an extensive civil defense program the company has provided an emergency site that could house employees and provides abundant storage space for important records.

Survival—J&L officials say that should existing facilities survive a nuclear attack or if new facilities had to be built, the site would offer refuge for men needed to operate the company.

A plan for industrial defense education has been set up for all employees. Another phase of the defense program is the establishment of the emergency headquarters.

Relocation—Under this plan, J & L offices, now in Gateway Center, would be relocated. Facilities for carrying on communications and administrative operations would be available. Some areas would be used for operating activities, others to house relocated personnel.

Underground—The underground portion of the headquarters and the area for storage of records is constructed of reinforced concrete under about 150 ft of earth. The vault has approximately 17,000 ft of storage space.

Last week, in a demonstration of its facilities for Federal, state and government officials, J & L staged a mock shutdown of its strip mill involving about 1000 workers. Later a tour of the emergency facilities, (the location is classified) was taken.

Navy Awards Contract For Metals Research

The Navy has awarded a $356,000 contract for development work in producing and rolling molybdenum alloy sheet for possible application in rockets and missiles to Chemical and Metallurgical Div., Sylvania Electric Products, Inc., Towanda, Pa.

Paul W. Felten, chief of the division says, "the experimental work is designed to develop molybdenum in sheet form with physical properties able to withstand extreme temperatures generated by fuels used to power space vehicles."

Mr. Felten says the contract provides for the production, through powder metallurgy techniques, of the sheets in various sizes.

U. S. Pipe Plans Expansion

U. S. Pipe and Foundry Co., N. Birmingham, Ala., will spend $6 million for expansion and improvements this year.

Claude S. Lawson, president, says most of the money will be spent for improvement and modernization. An addition to the mineral wall insulation plant at N. Birmingham, and improvements at cast iron pipe plant and concrete subsidiary near San Francisco are principal facilities.

The company spent $5.9 million for similar programs last year.

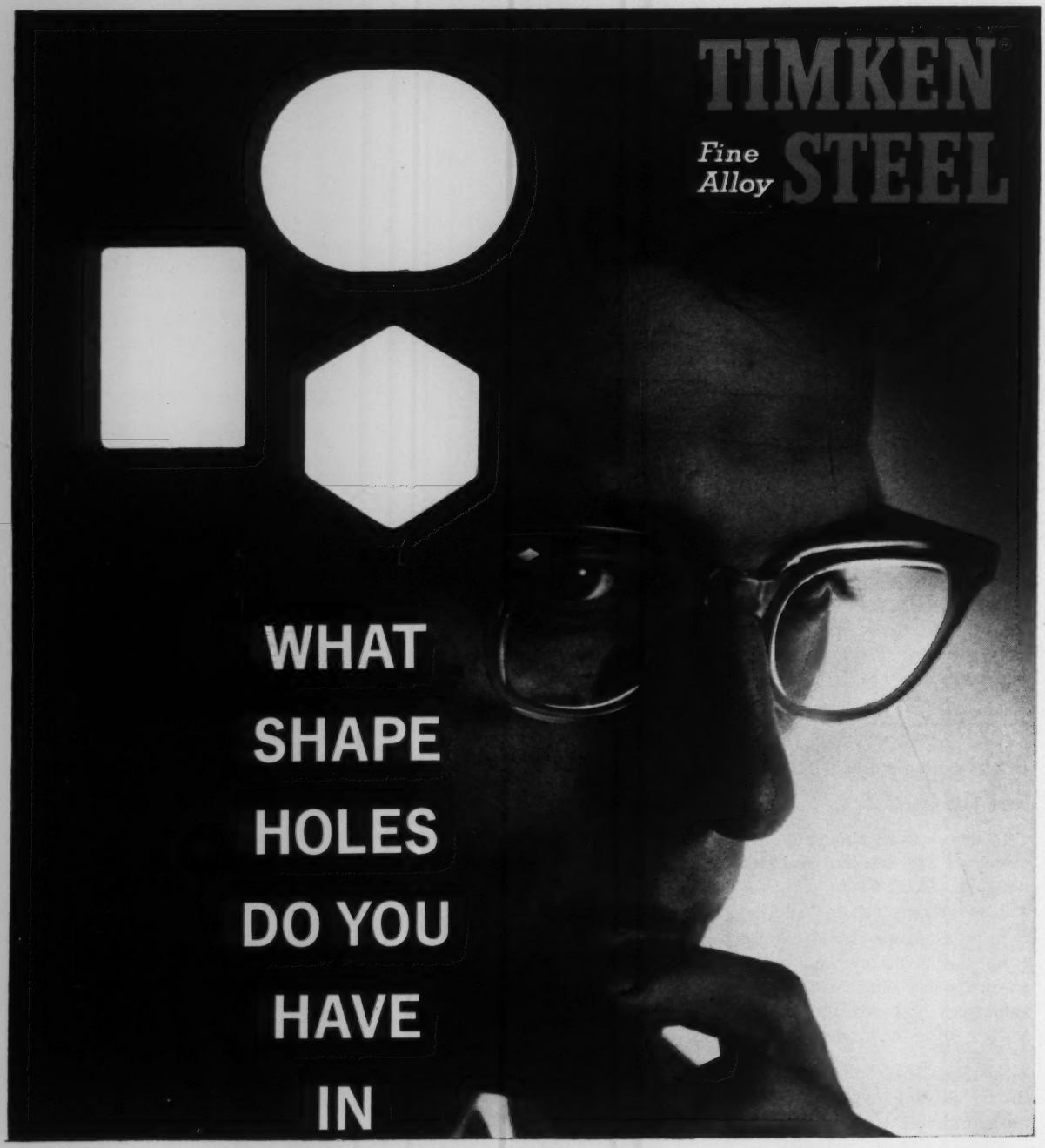
Allegheny Ludlum Plans Spending Program

Allegheny Ludlum Steel Corp., Pittsburgh, will spend $40 million for expansion and modernization over the next three years.

The largest program is a new steel rolling and processing mill being built on a 90-acre site at Bagdad, Pa.

The facility will produce high-grade, grain-oriented silicon electric strip steel. A large normalizing line, a cold-rolling mill, equipment for slitting and shipping, and auxilliary equipment for processing electric strip steel will be installed.

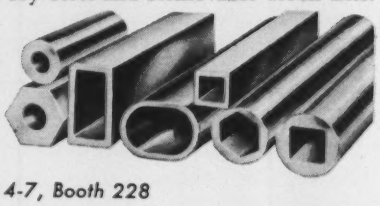
Previously, the company had announced plans to build the world's largest vacuum-melting furnace at its Watervliet, N. Y., works. The furnace will produce ingots up to 50 in. in diameter.



No matter. Whether you need a round hole, a square hole or a hex hole for the hollow parts you manufacture, you can eliminate costly machining operations. Start with Timken® seamless steel mechanical tubing and your first step will be finish grinding.

With a special cold working operation, the Timken Company can supply you a variety of shapes and sizes of high quality alloy steel in all common analyses. You get extra strength from the forged quality and spiral grain flow of rotary pierced tubing. And because we target the process to *your* end use, you're assured superior quality and uniformity in your products.

For more information on how Timken seamless steel tubing can save you time and money in all your hollow parts, write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.



See us at the Atomic Exposition, New York Coliseum, April 4-7, Booth 228

Credit Freeze Starts to Thaw

While a period of easy money isn't likely, spending controls will probably be relaxed this spring.

It's a result of winter slowdown in business, plus belief that inflation is now less of a threat.

■ This has been a disappointing winter for business optimists. But one encouraging fact is emerging from all the gloom and uncertainty —the prospect of easier credit.

Tight money restrictions show signs of easing. The Federal Reserve Board isn't departing from its close control on credit. But it does seem ready to relax its stand a little.

Stable Prices—Two reasons are responsible. The slowdown in business activity is one. A better flow of credit should increase spending.

Second is the apparent belief that the danger of more inflation is lessening. Price trends in the last year support this argument.

There has been little upward movement in prices. The consumer price index (1947-1949 = 100) started 1959 at 123.8. It advanced to only 125.5 by the end of the year. Wholesale prices are even more stable. The wholesale price index was 119.5 when 1959 began and dropped slightly to 119.2 by mid-February, 1960.

This stability makes it easier to relax credit controls. Even the coming boost in industrial capital spending (see P. 59) shouldn't be inflationary. Much of this spending will come from funds internally generated.

Rates React — There probably won't be any drastic changes in the government's money policies. It's unlikely, for example, that the FRB will lower the discount rate—the borrowing rate it charges member banks.

But already other rates are reacting to the shift in the money market. Interest rates on commercial paper—short-term borrowing—declined twice last week.

Help for Housing? — Two markets which may benefit from easier credit are housing and consumer durables. And, in both cases, relief can't come too soon. New housing starts (seasonally adjusted) slipped off again in February, down 8 pct from January levels. January, in turn, was below December. Housing officials say the shortage of mortgage money last fall is one of the reasons for the decline.

Slow movement of consumer durables undoubtedly contributed to the turndown in industrial production last month. The FRB's seasonally adjusted production index (1957 = 100), was 110. This was down from the revised figure for January—111.

Why Buyers Are Important

■ Don't underestimate the power of the American consumer. It's increasing all the time. And economic developments in the U. S. are encouraging this growth.

These are the conclusions of Prof. George Katona, director of the economic behavior program of the University of Michigan's Survey Research Center.

He lists these developments which have influenced U. S. buying habits:

Changing income patterns: In poor economies, most income must go for food, shelter, and clothing. But the large numbers of middle and upper-middle income groups in the U. S. can spend money on things other than the basic necessities.

More Reserves: Before World War II, most families had no bank deposits or government bonds. But while spending has increased, so has savings. Family assets rose from a pre-war total of about $45 billion to a recent $175 billion.

More Credit Buying: Purchasing on time has been generally accepted, especially by middle income families. Today about two-thirds of all families have some kind of debt.

Technological Advances: Consumers have accepted with enthusiasm the changes and improvements in durable and nonperishable goods.

Increased Intelligence: Economic knowledge among American consumers has grown rapidly. News, either bad or good, spreads quickly throughout the country.

Employment Improved In February

Employment continued to improve in February, Labor Dept. reports show.

Joblessness declined by 200,000 to a total of 3.9 million. Normally there's little change in unemployment at this time of year. Employment improved, rising by 500,000 over January.

Vaughn Haynes, right, manager of production engineering, discusses "trap" line scheduling with Wilfred Pascoe, superintendent of press room.

Chrysler blanks strip steel by "trap" shearing on Wean coil processing line

Trapezoidal shearing from coil is, in many cases, the most economical way to prepare blanks for subsequent press operations. Two, independent, pivoting shear heads allow selection of the most economical proportions of the blanks for the finished shapes. This "tailoring" of the material to the end parts eliminates much of the material loss that would result if these same parts were stamped and drawn from square-cut sheets.

Wean has designed and built almost all of the "trap" shear lines used today. The installation shown is at Chrysler Corporation's mammoth Twinsburg, Ohio stamping plant. This Wean coil processing line incorporates strip cleaning, flexing, leveling and shearing operations that turn as-received mill coil into sheet, ready for press work.

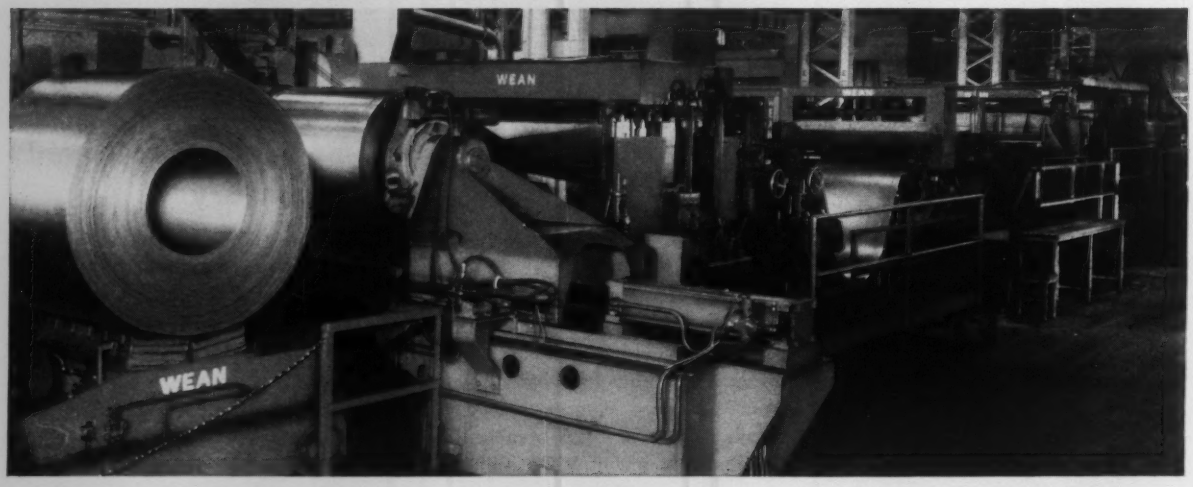
Today, more and more alert metalworking firms are turning to coil processing as one of the answers to rising production costs. If your firm uses approximately 500 tons/month of flat-rolled steel, you may be missing major material and overhead savings if you still purchase in sheet form.

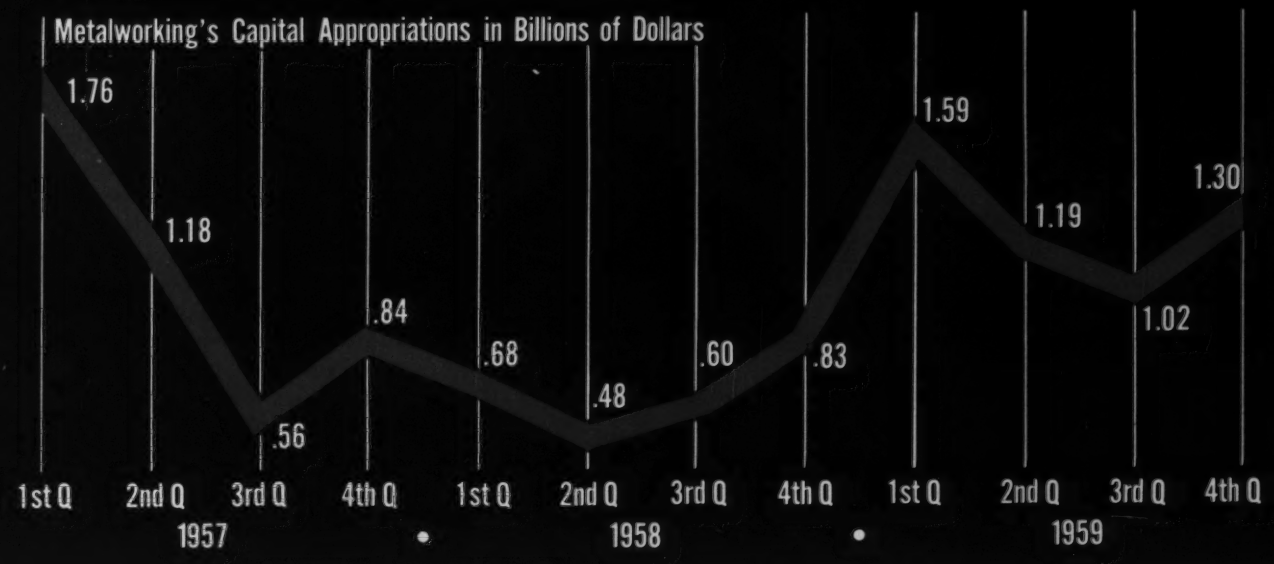
An experienced Wean representative will be able to tell you, or your production executives, if coil processing can cut your costs—and how much. Many firms have amortized the equipment costs involved within one year.

WEAN EQUIPMENT CORPORATION
CLEVELAND 17, OHIO

WEAN

Wean trapezoidal shearing line at Chrysler's Twinsburg Stamping Division plant produces blanks for body stampings from coils weighing up to 30,000 pounds.





Plant and Equipment Spending Looks Good Through 1960

Most metalworking industries stepped up appropriations for capital goods in fourth quarter '59.

This means a high level of capital spending throughout 1960. But the momentum is slowing.

■ Free of the uncertainties of the steel strike, the metalworking industry stepped up spending plans for new plants and equipment in the last quarter of 1959.

As a whole the industry boosted capital appropriations some $275 million over third-quarter 1959. The $1.3 billion total in the final three-month period is 56 pct above fourth-quarter 1958.

Bright Outlook—This foreshadows a high level of capital goods spending throughout most of 1960. Appropriations generally lead actual order placing by anywhere from six to twelve months.

Leading the fourth quarter upturn was the steel industry itself.

Expansion plans shelved temporarily during the strike bounded from $113 to $331 million in the third and fourth quarters of last year. This fourth quarter total has been topped only once in the past three years. It runs over 200 pct higher than fourth quarter 1958.

Yearly Totals Double—For the year metalworking's capital appropriations in 1959 doubled those in 1958. Another important factor in the drive to higher capital appropriations is the automotive industry.

Auto makers wound up the year appropriating 125 pct more for

First of a 1960 Series: Metalworking's Capital Spending Plans

THIS WEEK—This survey of capital appropriations in metalworking is conducted quarterly for The IRON AGE by The National Industrial Conference Board.

NEXT REPORT—Look for the next quarterly report in one of The IRON AGE's mid-June issues.

AUTO STRENGTH: Continued capital outlays for small-car production, like this Ford Falcon, are a factor in high auto appropriations.

capital goods than they did in 1958. While the auto appropriations rate dropped off in the last quarter it still ran 100 pct above fourth quarter 1958.

The continuing high rate of spending for capital goods by the metalworking industry is indicated by the quarterly survey of metalworking capital appropriations made for The IRON AGE by The National Industrial Conference Board.

Industry Rundown—A rundown of the major metalworking groups surveyed shows them all running well ahead of 1958:

Fabricated metals are up 44 pct; machinery up 48 pct; transportation equipment up 71 pct; instruments up 73 pct; electrical machinery up 83 pct; primary metals up 162 pct and metal furniture up 241 pct.

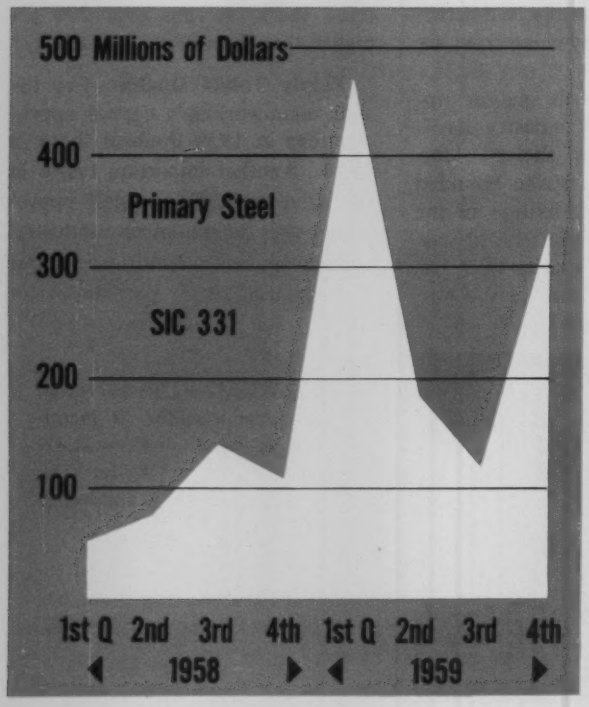
But a closer look at the detailed segments of the metalworking capital appropriations survey shows some industries were catching up on their unsatisfied demand for capital goods by the end of last year.

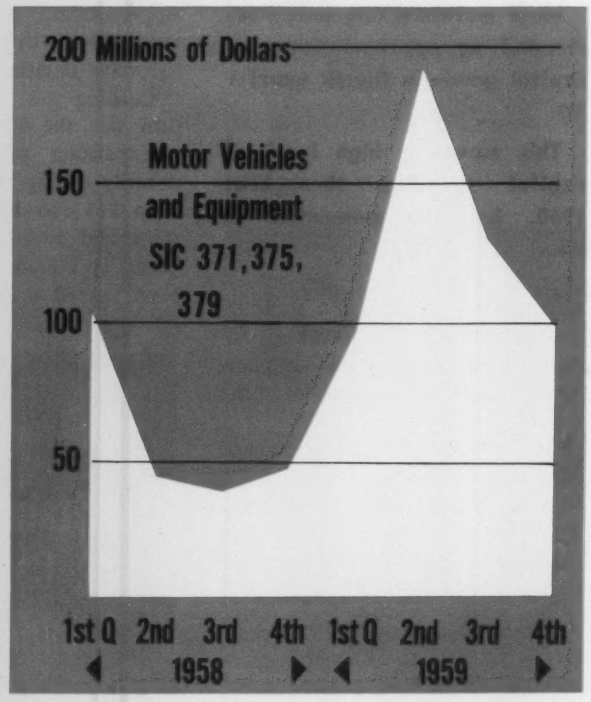
Momentum Slows — For some, the momentum for higher appropriations began slowing down from the mid-year peak. While the majority of metalworking industries increased fourth quarter capital appropriations, **the rate of increase** was slowing down.

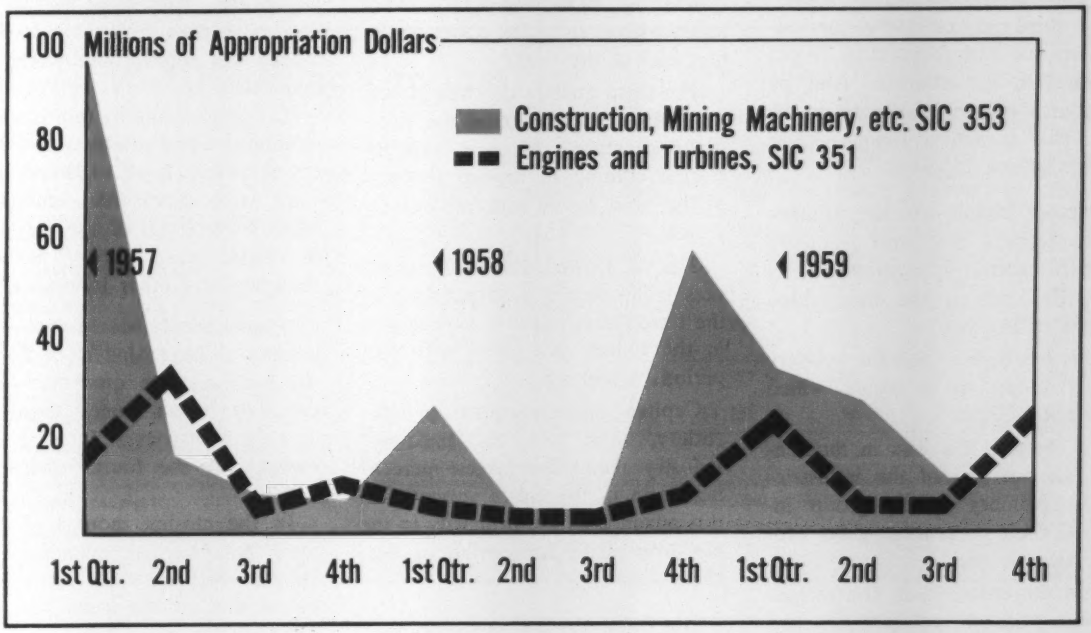
The momentum for higher appropriations hit the peak in second quarter 1959 when approvals ran

(*Continued on page 62*)

Steel, Autos Bolster Appropriations Totals







How Detailed Data Helps Market Planning

■ **The chart above shows the value of detailed appropriations figures in gaging future demand for capital goods in various metalworking industries.**

This three-year comparison traces the capital appropriations of engine and turbine makers (SIC 351) and those companies manufacturing construction, mining and material handling machinery (SIC 353).

Both groups are part of the broader nonelectrical machinery industry (SIC 35).

Check Performance—In comparing these curves, you'll notice the construction machinery group hit a three-year high in the first quarter of 1957. Then it plunged deeply in the second quarter.

Meanwhile, capital appropriations by engine and turbine makers, although lower in first quarter '57, rose sharply in the second to top the other group.

Latest Data — In the fourth quarter of 1959 capital appropriations by engine and turbine makers once more bounced upward. They topped the construction machinery group which held steady at the third-quarter level.

The point here is that these changes in capital spending plans could not have been detected from the broader, 2-digit appropriations figures for the entire nonelectrical machinery industry.

A look at the detailed table of capital appropriations by the nonelectrical machinery industry on p. 64 shows why.

Want 3-Year Data?

You can have 3-years of appropriations data on 37 industries together with a booklet telling how it can be used for market planning. Write The Iron Age Readers' Service Dept.

Broader View—The industry as a whole increased its capital appropriations $6.4 million from third to fourth quarter 1959. On a yearly basis it topped 1958 by 48 pct. In fourth quarter '59, however, it slipped 3 pct under the same period in 1958.

But fourth quarter appropriations by makers of construction, mining and material handling equipment tell a different story.

Appropriations were at the same level in third and fourth quarter 1959. For the year they fell behind 1958 by 11 pct. And in the fourth quarter comparison they plunged 80 pct downward.

Brighter Outlook—Engine and turbine manufacturers, however, show a much brighter appropriations picture. They stepped up capital appropriations by $18.1 million from the third to fourth quarter. They ended the year 183 pct ahead of 1958. And in fourth quarter '59 they ran 184 pct above fourth quarter '58.

(Continued from page 60)
150 pct higher than a year earlier.

By third-quarter 1959 the expansion rate had dropped to 70 pct of the year-ago quarter. And by the fourth quarter it slowed to 56 pct. This is still a sizable dollar appropriations increase.

Primary Metals—In the primary metals group the steel industry boosted capital appropriations by over 200 pct in the final three months of the year.

This ran higher than the primary metals group as a whole which averaged 171 pct.

But despite this loss in momentum, all but two of the industries in the primary metals group increased their percentage gains over year ago periods.

And the cutbacks in the miscellaneous primary metals group and the nonferrous rolling, drawing and extruding category were slight in terms of dollars and percentages.

Fabricated Metals—In the last quarter of 1959 metal fabricators appropriated at a rate closer to the first half of the year.

The third quarter downtrend was definitely a byproduct of the steel-strike shortage. As steel supplies started coming in toward the end of the year, the downtrend was reversed.

The fabricated structural products group turned a 25 pct drop in the third quarter into a 13 pct gain in the fourth, compared with like periods a year ago.

Capital appropriations by the cutlery, hand tool, and hardware industry made the largest percentage gain in the entire survey. But this advance is due primarily to the big drop off in appropriations during 1958.

Big Gain—In that year total capital appropriations came to less than $6 million compared to $26 million in 1957. Despite this, the industry's dollar gains in 1959 were impressive. They came to $40 million more than 1958. Most of the money was appropriated in the second half.

The gains made by fabricators of structural metal products and makers of cutlery, hand tools and hardware were more than enough to offset lower levels of appropriations in metal can, screw products, stamping and other industries.

Nonelectrical Machinery—After gaining at increasing rates through the previous five quarters, appropriations in the nonelectrical machinery industries suffered a small cutback in the fourth quarter of 1959.

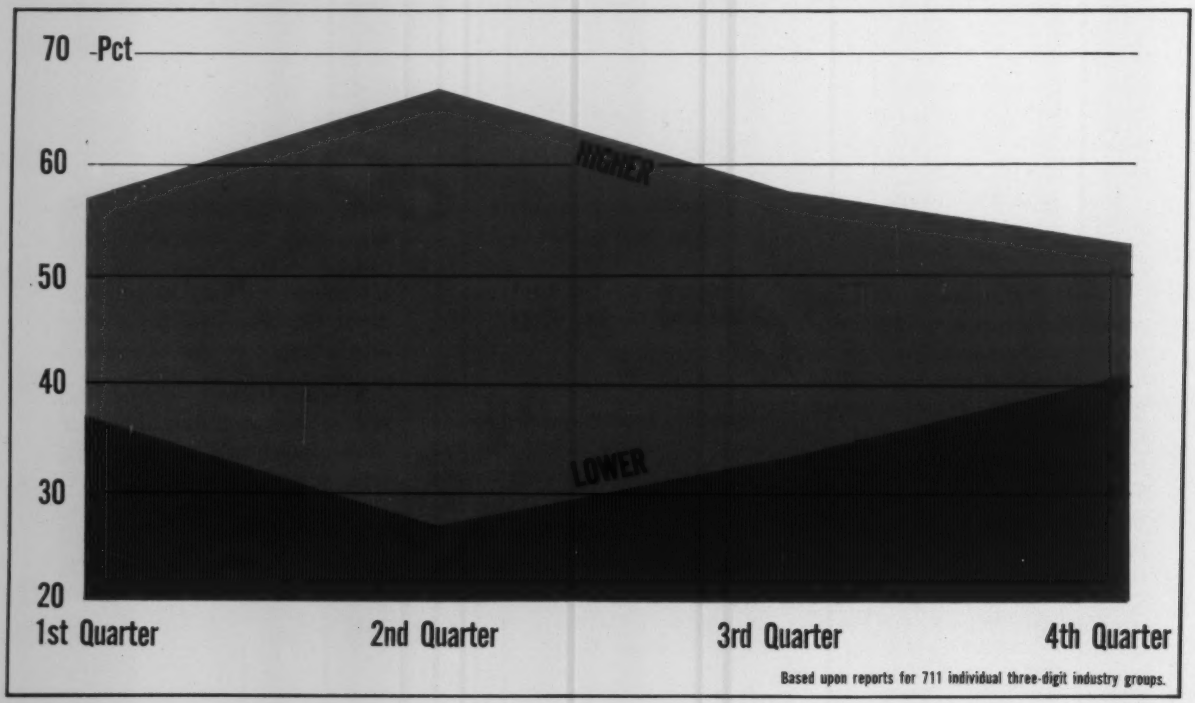
In the closing months of 1959 total nonelectrical machinery approvals dropped to a level 3 pct below that in the same period of 1958.

It was caused by a decline in the construction, mining and material

(Continued on page 65)

Appropriations Rate Loses Momentum

Units Reporting Higher and Lower Approvals—1959 vs 1958



Based upon reports for 711 individual three-digit industry groups.

Capital Spending Plans for 37 Industries

Major Metalworking Groups

Industry	SIC Code	Capital Appropriations—$ Millions 1958	1959	4th Qtr. 1958	4th Qtr. 1959	Pct Change 1959 over 1958	Pct Change 2nd Half 1959 over 2nd Half 1958	Pct Change 4th Qtr. 1959 over 4th Qtr. 1958
Metal Furniture	25	$4.1	$14.0	$0.5	$1.5	+241 Pct	+103 Pct	+197 Pct
Primary Metals	33	512.4	1,341.5	137.0	371.2	+162	+76	+171
Fabricated Metal Products	34	135.4	195.3	47.2	70.4	+44	+38	+49
Machinery (exc. Electrical)	35	369.2	547.2	139.0	135.3	+48	+28	−3
Electrical Machinery & Equipment	36	190.2	348.9	75.7	73.9	+83	+85	−2
Transportation Equipment	37	422.1	723.6	119.6	154.3	+71	+73	+29
Instruments, etc.	38	28.4	49.2	9.2	11.0	+73	+23	+20
Total Reported[1]		1,661.7	3,219.7	528.1	817.6	+94	+61	+55
Total Estimated for All Metalworking[2]		$2,593	$5,096	$832	$1,299	+96 Pct	+62 Pct	+56 Pct

Based upon returns from 481 companies reporting 711 separate industry groups.

[1] Excludes ordnance and accessories, SIC code 19, and miscellaneous metal manufacturing, SIC code 39.

[2] Estimated for entire metalworking universe. This includes metalworking firms operating at least one plant employing 500 or more production workers in 1957. See coverage table, page 66.

Source: The National Industrial Conference Board.

Fabricated Metal Products

Industry	SIC Code	Capital Appropriations—$ Millions 1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	Pct Change 1959 over 1958	Pct Change 2nd Half 1959 over 2nd Half 1958	Pct Change 4th Qtr. 1959 over 4th Qtr. 1958
Metal Cans	341	$7.1	$8.0	$11.3	$18.5	$12.0	$12.8	$9.6	$16.2	+13 Pct	−13 Pct	−12 Pct
Cutlery, Tools, Hardware	342	0.7	0	1.3	3.8	3.2	2.5	10.7	29.7	+684	+691	+689
Heating Apparatus (exc. elec.) and Plumbing Fixtures	343	3.8	1.8	1.8	3.0	3.5	2.3	3.1	3.7	+21	+43	+24
Fabricated Struct. Prod.	344	6.3	8.9	8.0	8.8	6.6	6.7	6.0	10.0	−9	−5	+13
Screw Products & Rivets	345	1.7	1.2	2.5	4.2	1.9	4.0	2.3	3.7	+23	−10	−13
Stampings	346	4.0	2.6	6.5	4.7	15.7	5.3	6.7	4.0	+78	−5	−14
Coating, Engraving; Misc. Fab. Wire Prod.	347, 348	2.2	−0.3	0.1	0.3	0.7	1.4	0.3	0.9	+42	+143	+194
Miscellaneous Fabricated Metal Products	349	2.9	3.7	2.0	4.0	3.0	2.6	2.1	2.3	−19	−25	−41
Total	34	$28.7	$26.0	$33.5	$47.2	$46.6	$37.5	$40.8	$70.4	+44 Pct	+38 Pct	+49 Pct

Transportation Equipment

Industry	SIC Code	Capital Appropriations—$ Millions 1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	Pct Change 1959 over 1958	Pct Change 2nd Half 1959 over 2nd Half 1958	Pct Change 4th Qtr. 1959 over 4th Qtr. 1958
Motor Vehicles & Equip.[2]	371, 375, 379	$101.0	$42.0	$36.9	$46.9	$95.7	$190.0	$127.3	$96.4	+125 Pct	+167 Pct	+106 Pct
Aircraft & Parts	372	51.4	27.4	26.5	67.6	61.0	43.3	34.9	55.0	+12	−4	−19
Ship & Boat Building	373	8.2	1.9	2.2	3.8	6.4	1.5	2.5	1.6	−25	−32	−59
Railroad Equipment	374	3.0	1.1	0.9	1.3	2.1	1.4	3.1	1.2	+27	+98	− 1
Total	37	$163.6	$72.4	$66.6	$119.6	$165.3	$236.3	$167.8	$154.3	+71 Pct	+73 Pct	+29 Pct

Electrical Machinery

Capital Appropriations—$ Millions

Industry	SIC Code	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	Pct Change 1959 over 1958	Pct Change 2nd Half 1959 over 2nd Half 1958	Pct Change 4th Qtr. 1959 over 4th Qtr. 1958
Elec. Transmission Equip.	361	$8.9	$5.6	$3.4	$17.4	$8.1	$11.0	$56.1	$14.9	+155 Pct	+241 Pct	−15 Pct
Electrical Ind. Apparatus	362	9.0	6.7	3.6	15.2	9.0	25.8	7.3	11.4	+55	0	−25
Household Appliances	363	7.4	3.5	5.4	3.6	8.7	10.6	6.1	4.6	+51	+19	+28
Electric Lighting & Wiring Equipment	364	2.3	1.4	1.0	5.1	2.8	5.4	3.1	6.5	+83	+59	+28
Radio & TV Receivers	365	1.1	1.3	0.9	4.1	1.4	3.8	5.9	2.5	+84	+67	−39
Communication Equipment	366	8.5	9.3	4.1	6.3	10.0	10.1	28.2	14.7	+124	+314	+135
Electronic Components	367	7.7	10.9	10.2	23.0	21.2	22.9	12.4	18.3	+44	−8	−20
Misc. Electrical Equipment	369	1.0	0.7	0.6	1.0	1.3	2.4	1.3	1.0	+46	+41	−3
Total	36	$45.8	$39.5	$29.1	$75.7	$62.6	$92.1	$120.3	$73.9	+83 Pct	+85 Pct	−2 Pct

Primary Metal Industries

Capital Appropriations—$ Millions

Industry	SIC Code	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	Pct Change 1959 over 1958	Pct Change 2nd Half 1959 over 2nd Half 1958	Pct Change 4th Qtr. 1959 over 4th Qtr. 1958
Blast Furnaces, Steel Wks. & Rolling Mills	331	$51.7	$72.1	$136.3	$104.9	$464.2	$182.3	$112.8	$331.4	+199 Pct	+84 Pct	+216 Pct
Iron & Steel Foundries	332	5.8	4.4	5.4	6.4	9.9	8.2	8.9	8.7	+62	+49	+36
Primary Smelt. Nonferrous[1]	333, 334	31.8	2.9	14.0	4.8	30.3	28.3	33.0	10.0	+90	+129	+110
Rolling, Drawing, Extruding Nonferrous	335	13.5	11.3	15.1	17.3	32.2	25.7	13.4	15.9	+52	−10	−8
Nonferrous Foundries	336	2.4	0.3	0.9	0.2	0.8	3.8	7.3	1.9	+259	+716	+811
Misc. Primary Metals	339	1.8	2.2	3.4	3.4	3.4	2.5	3.2	3.3	+15	−3	−2
Total	33	$107.1	$93.2	$175.2	$137.0	$540.8	$250.9	$178.7	$371.2	+162 Pct	+76 Pct	+171 Pct

[1] Includes secondary nonferrous smelters, SIC 334.

Nonelectrical Machinery

Capital Appropriations—$ Millions

Industry	SIC Code	1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	Pct Change 1959 over 1958	Pct Change 2nd Half 1959 over 2nd Half 1958	Pct Change 4th Qtr. 1959 over 4th Qtr. 1958
Engines & Turbines	351	$5.9	$3.6	$3.3	$8.4	$23.3	$7.0	$5.9	$24.0	+183 Pct	+154 Pct	+184 Pct
Farm Machinery & Tractors	352	5.2	9.5	18.7	13.4	18.9	14.2	11.8	12.9	+24	−23	−3
Construction, Mining, Handling Equipment	353	26.7	5.4	5.6	58.2	34.0	27.9	11.7	11.7	−11	−63	−80
Metalworking Machinery & Equipment[1]	354, 359	6.5	3.8	3.2	5.8	9.0	6.7	11.1	6.4	+73	+97	+12
Special Ind. Machinery	355	13.3	15.2	7.4	9.2	28.4	18.3	10.9	14.5	+60	+52	+56
General Ind. Machinery & Equipment	356	15.9	6.5	6.9	9.3	24.9	16.1	37.1	15.8	+144	+228	+71
Office & Store Machines	357	19.3	20.0	19.9	32.6	21.0	27.7	35.6	46.9	+43	+57	+44
Service Industry Machines	358	1.4	5.1	1.9	2.1	2.4	3.1	4.8	3.2	+27	+101	+51
Total	35	$94.3	$69.1	$66.8	$139.0	$161.9	$121.1	$128.9	$135.3	+48 Pct	+28 Pct	−3 Pct

[1] Includes miscellaneous machinery, SIC code 359.

Instruments

Industry	SIC Code	Capital Appropriations—$ Millions 1958 1st Qtr.	1958 2nd Qtr.	1958 3rd Qtr.	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	Pct Change 1959 over 1958	Pct Change 2nd Half 1959 over 2nd Half 1958	Pct Change 4th Qtr. 1959 over 4th Qtr. 1958
Laboratory, Scientific & Engineering Instruments	381	$2.1	$0.9	$0.8	$2.2	$5.3	$4.7	$2.5	$4.7	+186 Pct	+139 Pct	+112 Pct
Measuring and Controlling Instruments	382	3.8	2.3	4.3	4.0	6.2	7.8	3.6	3.8	+47	−13	−7
Other[1]	383, 384, 385, 386, 388	7.9	5.0	6.3	9.2	15.4	14.8	8.0	11.0	+73	+23	+20
		448.9	306.3	378.5	528.1	994.2	761.8	646.1	817.6	+94	+61	+55
Total	38	$675	$484	$603	$832	$1,588	$1,186	$1,022	$1,299	+96 Pct	+62 Pct	+56 Pct

[1] Includes optical instruments, surgical instruments, ophthalmic goods, photographic equipment and watch, clocks, clock-operated devices, SIC codes 383, 384, 385, 388.

(*Continued from page 62*)

handling equipment industry. During the final quarter of 1958 this industry set aside more than $58 million for plants and equipment, more than eight times the sum approved in the similar 1957 period. This amount was unusual and not likely to be repeated soon.

No Weakness — Thus, it was really the tremendous boost in the last quarter of 1958 rather than any clear weakness in the recent period's appropriations which explains the modest decline of 3 pct in total nonelectrical machinery allocations.

Outside the construction and mining equipment and the farm machinery sectors, fourth-quarter appropriations in nonelectrical machinery were strong. But they were not generally maintained at the same rate as in the previous three months.

Electrical Machinery — Appropriations in the electrical machinery sector hit a peak rate in excess of 300 pct over the year-ago period in the third quarter of 1959, crowning a year of successive gains.

In the last three months of the year, however, many forces caught up with this important group of industries, denting the long ascent.

The total reduction was very slight, however. Authorizations in the final quarter of 1959 fell short of those in the same period of 1958 by less than $2 million, only a two pct loss.

The electrical transmission and electrical industrial equipment groups reduced their fourth-quarter capital allocations by 15 and 25 pct, respectively.

In third quarter '59, however, the former increased appropriations by $53 million over the year-earlier volume. A boost of this size is hardly likely to be followed immediately by a further increase.

Electronics Decline — Manufacturers of electronic components reduced their capital authorizations by $5 million between the final quarters of 1958 and 1959. This was the largest dollar cutback by any electrical machinery category. This reduction may reflect principally the recent changes in federal defense programs, with resulting cancellations of some contracts.

On the brighter side, further approval gains were made during the

OFF PEAK RATE: After a year of successive gains, appropriations by electrical machinery makers fell. But the decline was small.

Survey Increases Plant Coverage

All companies in the industries listed below, with plants of 500 or more plant workers, were queried. They account for about two-thirds of the total employment and buying power in the metalworking industry. The last column shows the percentage of production workers employed by the companies cooperating in this survey. The last column shows appropriations per production worker.

Industry and SIC Code	Production Workers, Thousands	Production Workers, Thousands	Pct of Total Employment	Appropriations per Production Worker[1], $
	Companies With Plants of 500 or more	Cooperating Companies	Cooperating Companies	
Metal Furniture, 251, 252, 253, 254, 259	31	12	38 Pct	
Blast Furnaces, Steel Works, Rolling Mills, 331	596	314	53	$3,472
Iron and Steel Foundries, 332	82	61	75	586
Primary & Secondary Smelting, Nonferrous, 333, 334	54	50	92	2,052
Rolling, Drawing, Extruding, Nonferrous Metals, 335	115	79	69	1,098
Nonferrous Foundries, 336	19	12	66	1,123
Misc. Primary Metals, 339	37	22	59	572
Metal Cans, 341	47	45	94	1,135
Cutlery, Hand Tools, Hardware, 342	54	35	65	1,297
Heating Apparatus (except elec.) & Plumb. Fixtures, 343	33	19	58	681
Fabricated Struct. Prods., 344	60	30	49	987
Screw Prods. & Rivets, 345	26	15	60	774
Stampings, 346	76	54	72	584
Coating, Engraving; Miscellaneous Fabricated Wire Products, 347, 348	21	10	47	338
Mis. Fab. Metal Prods., 349	55	28	51	360
Engines & Turbines, 351	71	58	82	1,032
Farm Mach. & Tractors, 352	60	34	56	1,705
Construction, Mining Handling Equipment, 353	118	80	67	1,071
Metalworking Machinery & Equipment, 354, 359	107	66	62	506
Special Industry Mach., 355	47	23	48	3,157
General Industrial Machinery & Equipment, 356	90	58	67	1,559
Office & Store Machines, 357	78	58	74	2,278
Service Ind. Machines, 358	38	22	59	597
Elec. Trans. Equip., 361	90	47	53	1,899
Elec. Ind. Apparatus, 362	133	65	48	828
Household Appliances, 363	97	46	48	651
Electric Lighting & Wiring Equipment, 364	55	30	54	599
Radio & TV Receivers, 365	72	28	40	482
Communication Equip., 366	113	52	46	1,224
Electronic Components, 367	95	62	65	1,206
Misc. Elec. Equipment, 369	27	8	30	732
Motor Vehicles & Equip., 371, 375, 379	638	544	85	934
Aircraft & Parts, 372	522	484	93	401
Ship & Boat Building, 373	61	31	50	392
Railroad Equipment, 374	43	26	61	299
Laboratory, Scientific & Eng. Instruments, 381	41	16	39	1,087
Measuring & Controlling Instruments, 382	41	26	64	814
Other, 383, 384, 385, 386, 387	78	20	26	527
Total	4,020	2,673	67 Pct	.....

Based upon returns from 481 companies reporting 711 individual industry codes. Employment figures based on Iron Age Census data, 1957. Figures in last column calculated from unrounded data. A total of 1,190 plants with 500 or more workers reported. This is a new record for companies, plants and SIC codes reported.

[1] In dollars per production worker, based on appropriations made from first quarter 1959 through third quarter 1959 and plant employment of reporting companies in 1957.

SOURCE: The National Industrial Conference Board.

last quarter of 1959 in communication equipment, electric light and wiring equipment, and household appliances.

Transportation — The fourth quarter of 1959 witnessed a continued slackening in the rate of growth of transportation equipment appropriations.

They reached their peak in the second quarter, when they were 227 pct greater than in the comparable 1958 period. The third-quarter rate was reduced to 152 pct and that for the fourth fell to 29 pct.

The pace of appropriations in the latest period owed its sole support to a 106 pct advance in the motor vehicle industry.

The deepest percentage cut occurred in shipbuilding appropriations. This downturn was most likely the consequence of ample world shipping tonnages, as evidenced by the continued weakness in the ship charter market.

Except for the minus signs at year-end, the 1959 trend of appropriations in transportation equipment industry retained a definite upward tilt.

Instruments—The pace of capital appropriations by instrument makers slowed to 27 pct in the third quarter and 20 pct in the fourth quarter of 1959.

Mainly responsible for this lesser rate of gain in the fourth quarter was the reduced volume of appropriations in measuring and controlling instruments and in professional and timing devices.

Manufacturers of engineering and scientific research instruments, on the other hand, increased their authorizations by the largest dollar amount of any quarter in the history of the metalworking survey during the closing months of 1959.

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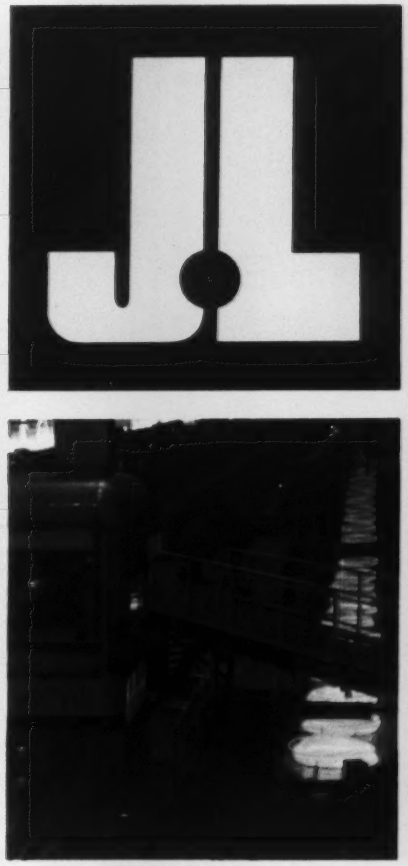

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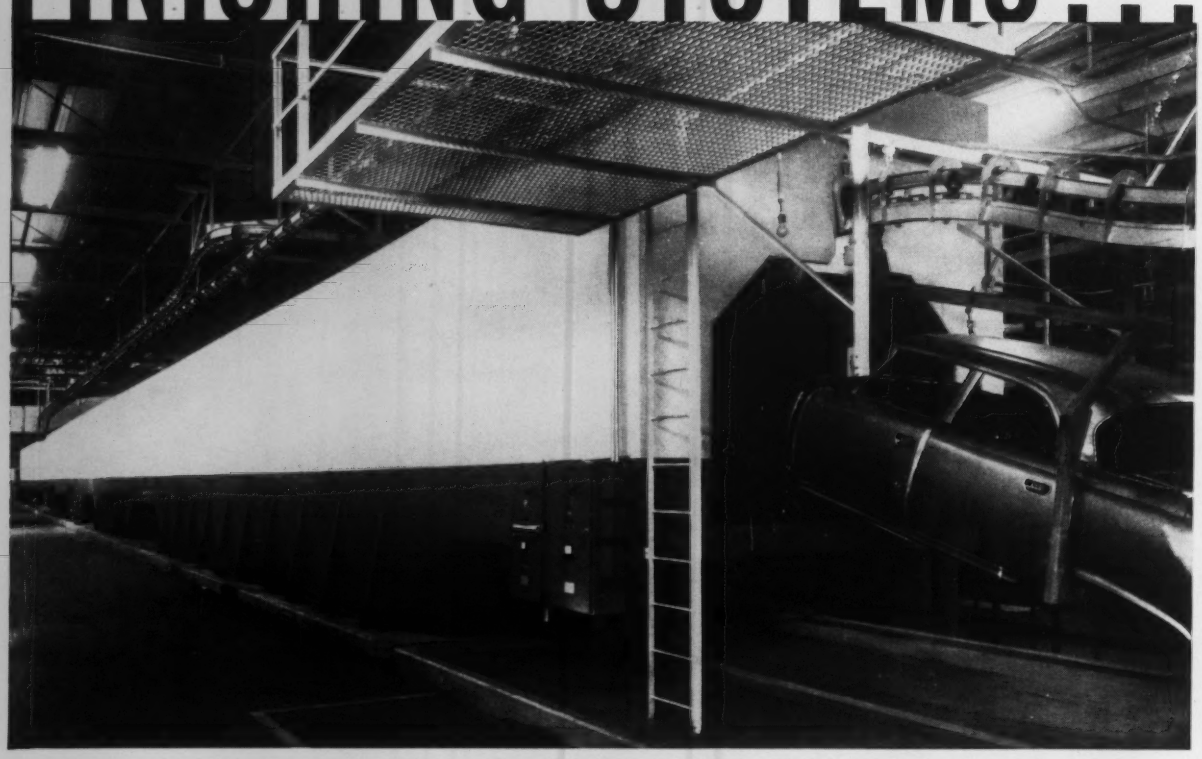

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Will Autos Use More Adhesives?

Advantages Cited for Joining Dissimilar Metals

Greater use of nonferrous metals for major auto parts will increase use of adhesives.

They can provide both a seal and bond, and join dissimilar metals without fear of galvanic action.—By A. E. Fleming.

■ Mounting use of adhesives for joining structural parts of cars is not too far away, predict two experts in this field. Paving the way for the move will be increased applications of lightweight, nonferrous metals as major auto parts.

Amid talk of more aluminum engines and revived interest by carmakers in magnesium for integral components, A. F. Thomson and A. F. Martin outline the adhesive trend. The men, from Minnesota Mining & Mfg. Co.'s Research and Development Adhesives Coatings and Sealers Div., presented their ideas at last week's Society of Automotive Engineers meeting in Detroit.

Structural adhesives are particularly suited to compete with present bonding methods for nonferrous materials, they contend, "and in some cases they're the only sensible joining methods."

Spread the Load—Messrs. Thomson and Martin say adhesives permit the use of lighter gauge metals since the load can be spread over a larger joining area. For one thing, adhesives provide a way to join dissimilar metals without fear of galvanic action. Adhesives are one solution to the problem of joining aluminum to itself and dissimilar metals.

Not to be overlooked, say the 3M researchers, is the fact that adhesives can be used as a combination seal and bond.

"Think of the headaches which will be eliminated when it's no longer necessary to gunk up the drip rail, trunk gutter, cowl or floor seams of the car with sealer," they point out. "No more asphalt to track all over the shop. This is a reality not too far in the future."

Paste-Up Engines—As one possible application, they visualize a unitized top in which present stiffeners, insulation pads and headlining are replaced with structurally-bonded honeycomb. For possible core materials, they list aluminum or paper. A face material could be reinforced plastic or a decorative laminate. An assembly like this would have strength and insulation value, and would save space.

But adhesive researchers aren't limiting the future of their product to car bodies. Engines show possibilities, too. Use of adhesives will enable auto engineers to achieve powerplant designs never before possible.

Auto laboratories haven't been stagnant in this respect, especially with practically every company deep in aluminum engine development. For some time, Detroit has been experimenting with adhesives for bonding sections of aluminum engine blocks. Adhesives with high heat-resistant qualities have been tried out.

The Problems—However, use of adhesives in structural applications

Tricky Truck Tackles Tough Tests

STUMP JUMPER: Virtually nothing can "stump" the Swiss-designed Flex-Trac, a rough terrain truck being evaluated for commercial use by Clark Equipment Co. It can raise any of its three pairs of wheels off the ground, climb 3-ft. high walls. It has a highway speed of 56 mph.

faces many problems. Cost is a major factor.

Nonetheless, Messrs. Thomson and Martin think consideration should be given to the fact that present ways of joining ferrous metals represent an investment of over 30 years of auto engineering. "We question if the all-steel body was initially cheaper than the composite body it replaced," is their comeback.

Another annoyance is bonding to an oily steel body. It costs money and space to remove oil. And unprotected steel quickly deteriorates through oxidation. "However, an adhesive should be given the same consideration regarding metal preparation as auto enamel or lacquer," say Messrs. Thomson and Martin.

Quick Cure—Then there is assembly speed to consider. Here, again, adhesive engineers are up against 30 years of ferrous metal engineering.

Effort is continuing, however, to shorten curing time cycles of present adhesives and develop faster curing types to make adhesives cheaper for high-volume production needs.

Despite such problems, they claim structural bonding in cars has a very good present and even brighter future. High solids pastes are used today to bond stiffeners to exterior body surfaces. They are bonding to oily metal. Curing takes place during the paint curing cycle. These pastes also are used as an adhesive-sealer in combination with hemming operations, say the 3M researchers.

Test Engine Has See-Through Top

A one-cylinder overhead valve engine with a quartz-topped piston may answer some questions about the burning of air and fuel in high-compression car engines.

Dr. F. W. Bowditch, of General Motors Research Laboratories, says the engine for the first time allows natural color motion pictures to be taken of air-fuel "burn," exactly as it occurs in engine service.

Updating Studies—It's already made possible a series of high-speed color photos of combustion at compression ratios up to 10.7 to 1, and combustion occurring under both road load and full throttle engine conditions.

Earlier window engines, L-head designs with quartz heads, never could be run above 7 to 1 ratio. Today's valve-in-head engines range from 8 to 1, to 10.5 to 1.

How It Works—Basic difference between the new type and its predecessors is that high speed photos are taken through the transparent top of the piston rather than through a quartz window in the head, or from the bottom upwards instead of the top downwards.

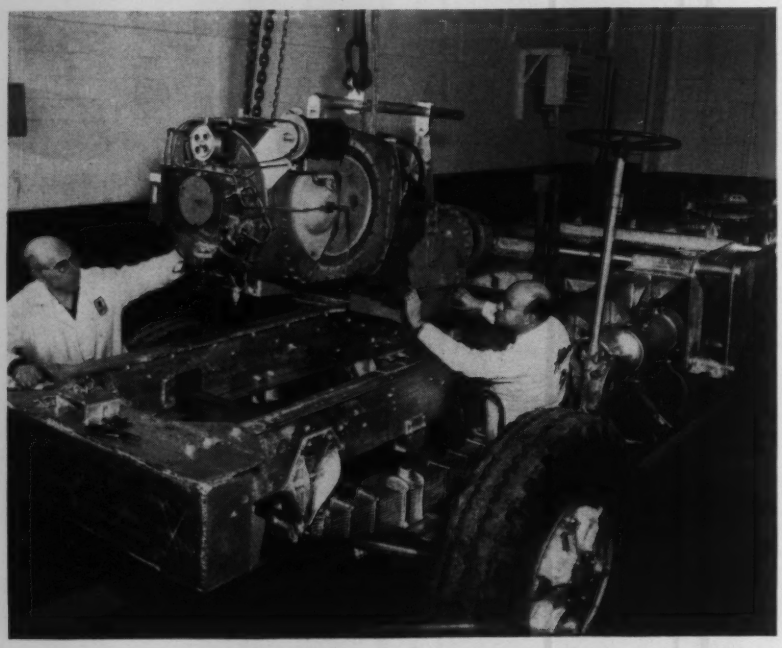
Dr. Bowditch says the development was delayed by two key technical problems. One was a satisfactory way of bonding quartz to metal of a piston. This was solved by use of new adhesives. Another problem was designing an engine to which the basic idea of a transparent piston top could be adapted.

Clear Crown — Such an engine had to be able to accommodate an elongated and heavy piston and an elongated cylinder. The piston crown is clear fused quartz with polished top and bottom surfaces for optical purposes.

Under the piston top is an angled mirror on which the combustion action reflects. This image is photographed by a highspeed camera.

Also needed in the assembly is a transparent disk or collar at the top of the cylinder to admit external light into the combustion chamber. This was a problem, inasmuch as engine heat distorted the disk. But a water-cooled laminated quartz-metal disk was designed.

Test Turbine Engine in Ore Truck



NICKEL'S WORTH: International Nickel Co. will test this gas turbine engine, developed by Allison Div. of General Motors, in an ore-hauling truck at its Sudbury, Ont., open pit mine. About 30 lb of nickel are used in alloys for the engine, mostly in "hot end" parts such as turbine blades.

this 480 ton giant has 5 heads

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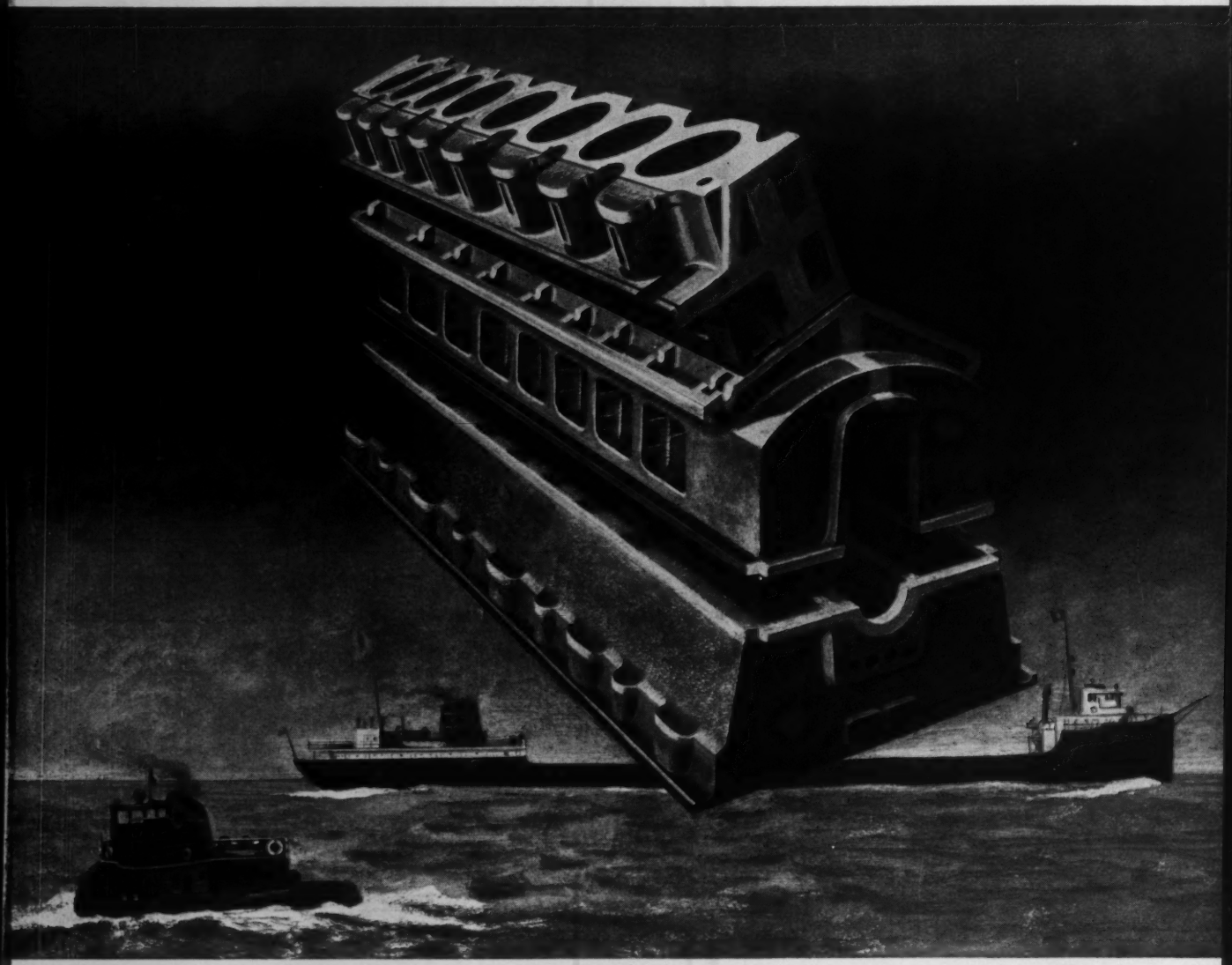

5 REASONS WHY IRON CASTING IS SPECIFIED FOR 7700-H.P. DIESEL CRANKCASE

Fabrication of steel was first specified for this 35,000-lb. crankcase of a 7700-hp. marine diesel engine. But, after careful study, the obvious advantages of gray iron dictated the final choice of a gray iron casting.

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Federal Business Tactics Hit

Senate Wants End of Commercial-Type Ventures

The Administration is under pressure from the Senate to end business ventures competing with private industry.

However, many government agencies are opposed.—By G. H. Baker.

■ The White House is under new pressure to pull the government out of competition with taxpaying businesses and industries.

A Senate committee report accuses the Eisenhower Administration of dragging its feet in moving to kill off the government's many commercial-type activities that compete with private enterprise.

The Areas—The complaint is aimed at such government activities as engineering research, warehousing, construction, retailing, and trucking.

"The Administration appears to have lost some of its earlier enthusiasm for this program," the Senate-House Economic Committee remarked tartly in reviewing the faint-hearted efforts of the White House to knock off a long list of commercial-type activities.

Then and Now—Several years ago, the White House spoke with courage and vigor of its intent to withdraw from activities that compete wtih taxpaying enterprise. But the many departments and agencies of government concerned were reluctant to support the White House. Each agency wished to keep its racket going. And the White House was reluctant to knock any heads together.

For example:

The Army, Navy and Air Force resisted suggestions that they get out of the retail grocery business and the department store trade. The General Services Administration bucked suggestions that it leave warehousing to the warehousing industry. Military Air Transportation Service (MATS) resisted efforts to get out of the passenger and freight air cargo business. And the Post Office explained that it was "necessary" for it to manufacture its own mail bags, instead of buying them from bag factories.

Congress, Too — The White House is not entirely to blame, however. Congress itself is partly to blame. Many Senators and House members have acted to forestall closing down government plants located in their home districts.

Foreign Aid to Go On Indefinitely

U. S. foreign aid, according to the State Dept., will go on indefinitely.

State Dept. planners once believed it was neither desirable nor necessary to let foreign aid run on and on without any terminal date. But the department has now changed its mind. The new line is that we must continue the aid program for what the department modestly calls "some years to come."

Long Talk Delays Bills

■ Many good bills as well as bad will be blocked from becoming law this year. Reason: Prolonged haggling over civil right bills, in the face of adjournment by early July.

National political conventions are a "must" for all members of the Congress. Republicans meet in Chicago, starting July 25. Democrats meet in Los Angeles, starting July 11.

The Long Talk — Because the civil rights filibuster has tied up the Senate, there is now serious doubt about the chances for many bills that were believed to be shoo-ins earlier this year.

Among them: Higher minimum wages, federal regulation of retail workers not now covered, plus higher minimum pay for them; higher pay for teachers, more slum clearance money, higher interest on government bonds.

Off Track—There's some talk in the Senate of passing up the customary 10-day Easter recess. The civil rights delay has knocked Majority Leader Lyndon Johnson's timetable off the tracks. Few Senate hearings have been held in recent weeks, due to the filibuster.

There is a growing logjam of important bills on the Senate calendar, including the all-important appropriations bills. The government's new fiscal year starts July 1. If the money bills (including the all-important $41-billion defense appropriations bill) are not approved and signed by the President before that date, there may be some delay in paying contractors and some payless days for Pentagon clerks.

Farwest Braces for Labor Talks

Aerospace Union Contracts Run Out This Spring

Unions representing Farwest's aircraft and missile workers are after 7 pct wage boost in new contracts.

Boeing, where agreements expire in April and May, will be first target for union negotiators.—By R. R. Kay.

■ Tough labor bargaining is coming this spring for the West Coast aerospace industry.

Most of the Coast's aircraft companies are getting set for new contract talks with labor unions. The exception is Northrop Aircraft, Inc.

Union Aims—The International Association of Machinists and the United Auto Workers represent about 85 to 90 pct of the factory workers in Farwest aircraft plants. Both unions are cooperating in the drive for better contracts.

As it looks now, they'll ask for a 35¢ to 38¢ hourly increase spread over two years. That's a lot smaller than past demands.

The basic hourly wage in the industry is $2.66. The unions want a 7 pct hike to boost it to $2.85. That's a 19¢ rise per hour. The other 16¢ to 19¢ is for a long list of fringe benefits: Health and welfare, sick leave, double pay for overtime, pensions, severance, relocation, and off-site pay

Boeing Leads Off—Boeing will be the first company target for the union. Boeing's contracts expire in April and May. There will be negotiations with Douglas, Lockheed, and North American probably starting in May.

Two years ago, Boeing made a contract with the IAM for much smaller increases than those signed later with the other major producers. If the union can make a good settlement with Boeing, it will take a tough position with the other companies.

However, both the IAM and the UAW know the score. The industry is going through a painful transition from manned aircraft to missiles.

Labor's Weak Point—From now on fewer blue-collar workers will be needed in missile-making. Industry employment is shrinking. So is union membership.

The end of May will see all West Coast union contracts run out. Right now, it's too early in the negotiations to get the feel of things.

But this is certain: The IAM and the UAW are not dealing from a position of strength.

Mock Torpedo Run for Prop-Jet Patrol Plane

FRIENDLY FOES: Lockheed-built Y/P3V-1 uses submarine U.S.S. Capitaine in test of prop-jet's low-level, high-speed attack capabilities. Anti-submarine plane is making mock torpedo run off the California coast.

More Gains for West

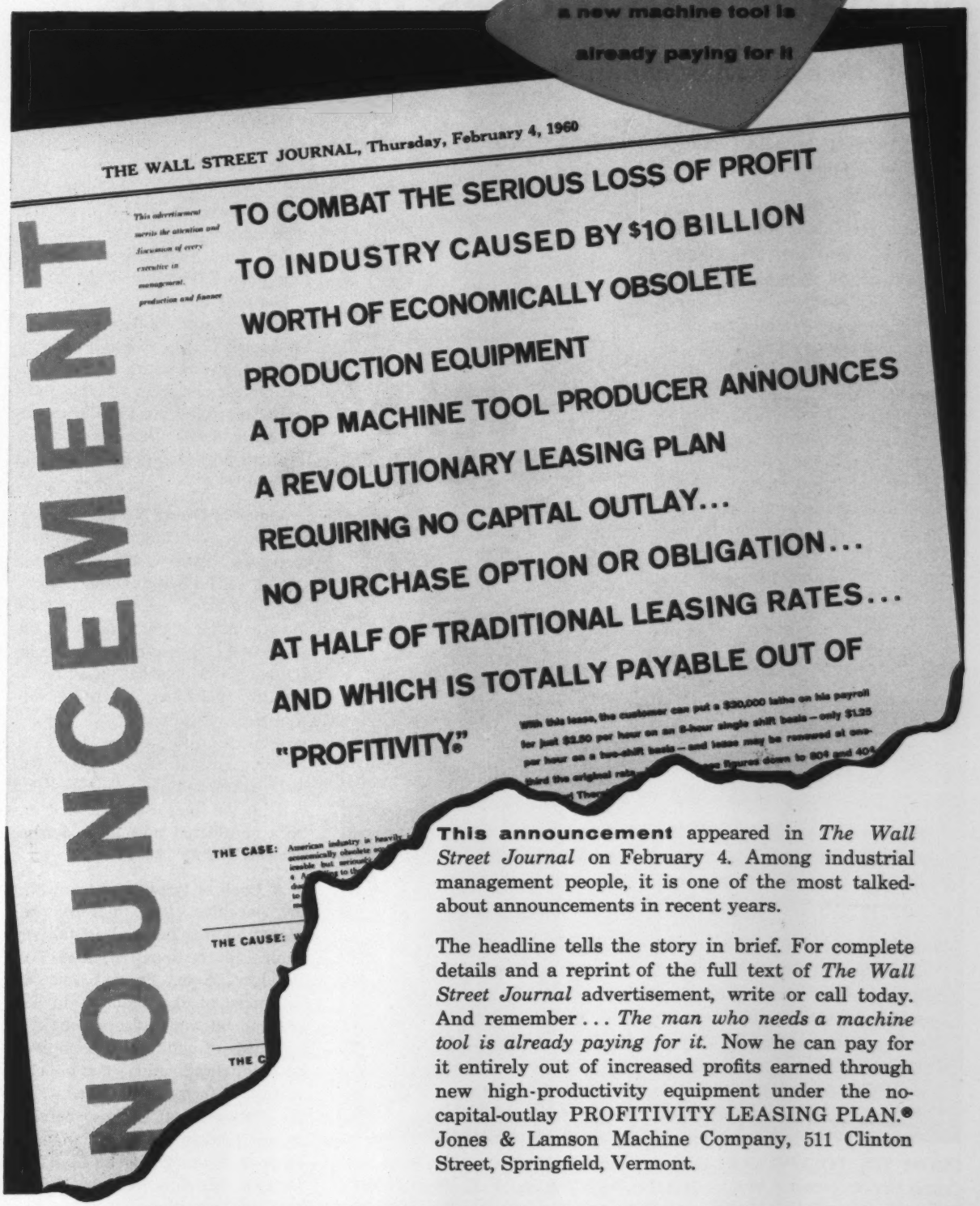
There's encouraging news on the way for firms selling the West Coast market.

Preliminary figures of the 1958 Census of Manufactures show that in the West Coast states value added by manufacture jumped from $11.1 billion in 1956 to $15.5 billion in 1958.

California moved into second place in the nation in value added by manufacture.

JONES & LAMSON MACHINE COMPANY

the man who needs a new machine tool is already paying for it


NOUNCEMENT
THE WALL STREET JOURNAL, Thursday, February 4, 1960
This advertisement merits the attention and discussion of every executive in management, production and finance
TO COMBAT THE SERIOUS LOSS OF PROFIT
TO INDUSTRY CAUSED BY $10 BILLION
WORTH OF ECONOMICALLY OBSOLETE
PRODUCTION EQUIPMENT
A TOP MACHINE TOOL PRODUCER ANNOUNCES
A REVOLUTIONARY LEASING PLAN
REQUIRING NO CAPITAL OUTLAY...
NO PURCHASE OPTION OR OBLIGATION...
AT HALF OF TRADITIONAL LEASING RATES...
AND WHICH IS TOTALLY PAYABLE OUT OF
"PROFITIVITY"
THE CASE:
THE CAUSE:

This announcement appeared in *The Wall Street Journal* on February 4. Among industrial management people, it is one of the most talked-about announcements in recent years.

The headline tells the story in brief. For complete details and a reprint of the full text of *The Wall Street Journal* advertisement, write or call today. And remember . . . *The man who needs a machine tool is already paying for it.* Now he can pay for it entirely out of increased profits earned through new high-productivity equipment under the no-capital-outlay PROFITIVITY LEASING PLAN.® Jones & Lamson Machine Company, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

Military Restudies Tool Plans

New Concepts May Mean New Machine Tool Policies

New reports stimulate new studies of defense machine tool reserve policies.

Emphasis is likely to shift to tools that can cut into lead time.—By R. H. Eshelman.

■ Rumbles from Washington signal another switch in defense thinking. And it could be vitally significant for the machine tool industry.

Are adherents of the concept of the 30-minute, push-button war having second thoughts? Does it mean that defense production potential will be an important factor in the future? Would new machine tools cut the tooling gap, give us push-button production plants?

Controversial Surveys — Several surveys and studies have injected a note of controversy into this picture. One was the John Hopkins Army survey. Contents of this have never been divulged. But it's learned from reliable sources that this study was critical of our present defense plant equipment.

On the other hand, a study on machine tool modernization and replacement for the Air Force Materiel Command is reported to have found the aerospace industry in a good position.

Tooling Programs—Just recently released is a comment by the Aerospace Industries Assn. on this subject. It states that "major advances in procurement of modern machine tools specifically for the aerospace industry have been made through a cooperative program of The Air Force and the Manufacturing Equipment Committee of the AIA."

The program referred to involved purchase of some 600 machine tools for approximately $80 million, over the past several years. Of particular interest are some 24 skin mills and 81 profiling machines with numerical controls. Their total value of about $30 million is included in the matter.

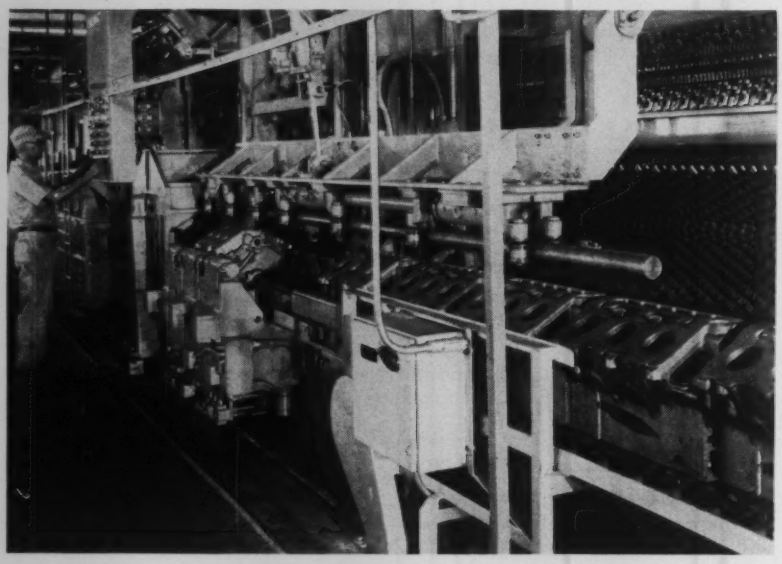
Aimed at Future Needs—This report indicates comprehensive performance specs and acceptance tests have been developed tailored to future needs. Often advice of the committee teams resulted in improvements in the tools. Also, installation was speeded, and time to get the machines in production shortened.

Look for more emphasis in the future on numerically controlled machines and other equipment that can cut the long lead time that has been considered normal in defense projects.

A Look at Imports—Meanwhile, the machine tool industry has gained another point. Last fall and winter, the National Machine Tool Builders' Assn. pointed out the weakness of the industry to key government and defense people.

Effects of cutthroat foreign competition, depreciation, tax policies, and other factors were cited. Now the Business and Defense Services Administration of the Commerce Dept. and the Office of Civil and Defense Mobilization are looking into the situation.

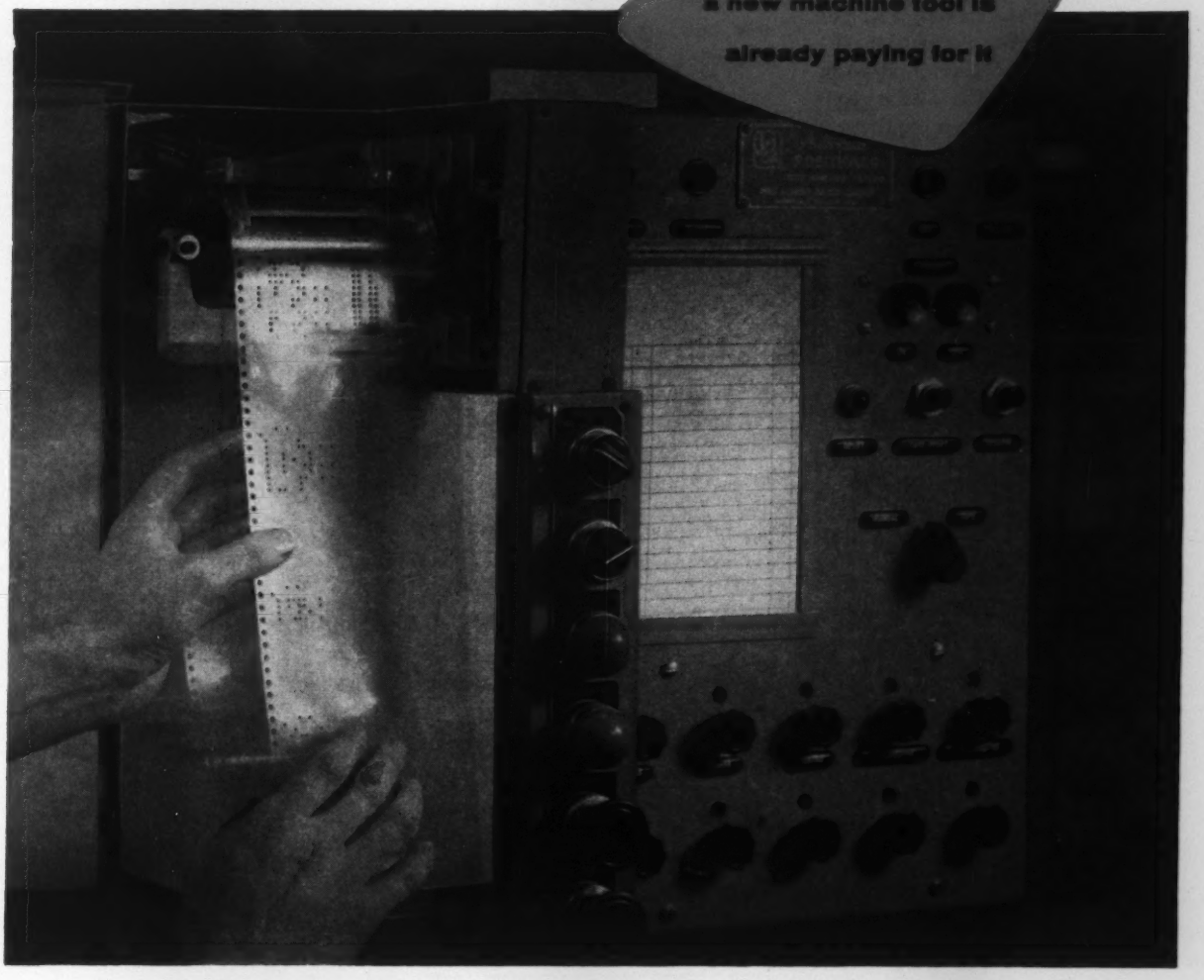
Big Broach for Big Jobs



FROM SIX TO TWELVE: Giant 100-ton broach at GMC Truck and Coach Div. of General Motors broaches both V-6 and V-12 engine blocks. Here, a line-up of V-6 blocks is ready to pass through. Teeth are at right.

JONES & LAMSON "AUTOMATION"

the man who needs a new machine tool is already paying for it



Numerical Control . . . what's it worth?

What *about* numerical control: is it all it's cracked up to be? The answer, in a word, is "yes". Here's why. With numerical control, the *big* factor is *flexibility*. Tape or numerical programming can be employed economically for medium or small lot production, even down to *single pieces*. Accuracy is also increased. For instance, Jones and Lamson tape controlled positioning units hold tolerances of ±.001 on applications for punching, drilling, boring or similar operations where point-to-point positioning is mandatory. Machine set-up and change-over become primarily an office procedure. Numerical control of machining operations eliminates the need for cams, templates, even prototype parts and special fixtures. It results in greater machine utilization, and speeds actual machining. Lead time is reduced, and because human error is largely eliminated, accuracy is improved.

Any way you look at it, numerical control has come of age. It's being used more and more, simply because it produces better, at lower costs. For detailed information, write Jones & Lamson Machine Company, Dept. 710, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

INDUSTRIAL BRIEFS

Power for Alan Wood—As part of its expansion plan, Alan Wood Steel Co., Conshohocken, Pa., has placed an order for electrical equipment with I-T-E Circuit Breaker Co., Philadelphia. The silicon rectification and switchgear equipment will be used in a substation providing power for Alan Wood's new 4-inch slabbing mill and 110-inch plate mill.

Zinc Oxide for Farwest—Bunker Hill Co. has announced plans to produce zinc oxide on the West Coast. This will make it the only primary producer of the product in the Pacific area, the company points out. Bunker Hill has made and marketed lead oxide for the Farwest area since 1948.

Atomic Energy—Henry C. Beck Co., Atlanta, has been awarded a contract for construction of a new metals and ceramics facility for the Metallurgy Div. at Oak Ridge National Laboratory. The $4,871,000 contract calls for construction of a laboratory building addition, and an industrial type structure.

Long Line—A ribbonrail welding plant, under construction at Harrisburg, Pa., will produce continuous welded rail for the Pennsylvania and other railroads. The plant is being built by Linde Co., Div. of Union Carbide Corp. Rail will be welded as it comes from the rolling mill.

Availability List—Full lines of stainless steel tubing, pipe and fittings are now available from Carpenter Steel Co. mill branch warehouses at Indianapolis and St. Louis.

Opening at New Jersey—A new warehouse and branch office at 1025 Greeley Ave., Union, N. J., has been opened by Besly-Welles Corp., South Beloit, Ill. Besly-Welles also maintains warehouse facilities at Chicago, Cleveland, Detroit, and Los Angeles.

Connecticut Expansion — The Nelco Tool Co. is expanding manufacturing facilities of its plant in Manchester, Conn. Nelco is a subsidiary of the Cutting Tool Div. of Brown & Sharpe Mfg. Co. The new building is scheduled to be finished in April.

Aluminum From Canada—The Aluminum Co. of Canada Ltd., Canadian subsidiary of Aluminium Ltd., will invest $1.6 million for furnaces and equipment at its Kitimat, British Columbia, smelter. The plant is expected to produce about 36,000 tons of extrusion ingot annually. Its present rated capacity is 186,000 tons of primary aluminum.

Welding Wire Producer—American Alloys, Inc. has opened plant facilities at Newark, Calif., near San Francisco. The company, which makes automatic and cut alloy welding wire, now has a 15,000 sq ft building there. The plant has been designed to allow expansion without production interruption.

Specialty Metals Distributor — Republic Supply Co. of Calif. will handle distribution of specialty metals in a new plant now under construction. The new unit, 72,000 sq ft in size, will adjoin the company's present Los Angeles property at 2600 Eastland Ave. It will stock aluminum, stainless steel, alloy steel, and cold-finished bars.

"Don't think your work around here has gone unnoticed, Bailey, but I'm still willing to give you another chance!"

Mold Coatings Plant—The Mold Coat Div. has been organized at the Albi Mfg. Co., Inc., Rockville, Conn. It will specialize in chemically formulated ingot mold coatings for the steel industry. The Division will include all development and production facilities for mold coatings. Marketing will be managed by H. L. Woods & Associates, Middletown, O.

Luria Renames Subsidiary — Luria Bros. & Co., Inc., suppliers of scrap iron and steel, has changed the name of one of its principal subsidiaries, Livingston & Southard, Inc. The subsidiary will now be known as Luria International, Inc.

Leeds Acquires Supplier—Leeds & Northrup Co., Philadelphia manufacturer of instruments, controls, and industrial furnaces, has completed the purchase of one of its suppliers, Thomas S. Gassner Co., and its affiliate, H. D. Dougherty & Co. Gassner makes sheet metal products while H. D. Dougherty has been a selling company for one of its specialty lines.

New Opening — Sel-Rex Corp., Nutley, N. J., has opened new offices at 1000 Peachtree St., Atlanta, Ga. Sel-Rex manufactures precious metal plating processes. Meaker Co., a Sel-Rex subsidiary, will also distribute products through the office.

Going Up — Birmingham Steel Buildings, Inc., Birmingham, Ala., has begun construction of a more than $100,000 new facility. The new addition will add 10,000 ft of floor space and will be used for manufacture of overhead cranes and monorails.

New Die Steel — Latrobe Steel Co., Latrobe, Pa., has developed an abrasion-resistant cold work die steel. Designated as BR-3 die steel, it can be used in brick mold liners, shot blast liners, ceramic tile liners and long-run blanking and forming dies. A technical data sheet is available from the company.

JONES & LAMSON MACHINE TOOLS

the man who needs a new machine tool is already paying for it

Brand-new! A fully automatic tracing lathe

This new J & L Model 30 Fully Automatic Tracing Lathe combines a number of flexible designed features, *and it's competitively priced.* The basic J & L ingredients of extra ruggedness and extreme precision are apparent throughout. (Note the unusual solidness of the tracing slide, for instance.) Specifically, it offers 1. *Fast and flexible set-ups* which are extremely simple, and accessible to the operator, 2. *Compact and convenient controls* for push-button programming of the automatic cycle, 3. *Automatic speed and feed changes* during a cut, 4. *Work handling facilities* that can be either automatic or manual (there's plenty of room for chip disposal, too).

In addition, this machine will accommodate any one of three different rear slides. It also offers a choice of two different headstocks. Moreover, the stylus and template are high and dry.

Details and specifications are contained in our brochure No. 5810. Write for your copy. Jones & Lamson Machine Company, 511 Clinton Street, Springfield, Vermont.

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L. B. Davis, elected vice president, General Electric Co.

Borg-Warner Corp., Spring Div. —**A. J. Welch,** elected president and general manager.

Flexonics Corp.—**A. S. Kromer,** elected president and general manager.

Union Carbide Development Co. —**J. B. Browning,** appointed a vice president.

Albion Malleable Iron Co.—**J. W. Hallock,** named vice president, sales; **Dr. F. B. Rote,** becomes vice president, technical director; **A. A. Behling,** named controller.

The C. O. Bartlett & Snow Co. —**C. J. Neville,** elected president and general manager; **H. S. Hersey,** elected chairman of the board; **J. R. Hersey,** elected vice president and treasurer; **F. W. Neville,** elected purchasing director and asst. secretary.

Alpha Metals, Inc., Alpha-Loy Div.—**H. A. Cohn,** elected vice president, Chicago; **F. C. Disque, Jr.,** named director of research.

Circo Equipment Co.—**Norman Fischell,** appointed vice president, production.

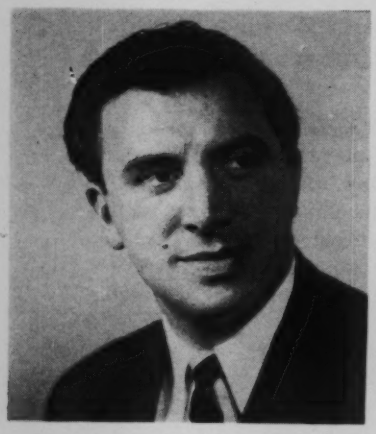
Melpar, Inc.—**W. C. Purple, Jr.,** named vice president, production.

A. M. Byers Co.—**H. K. Siefers, Jr.,** appointed manager, Engineering Service Dept., Pittsburgh.

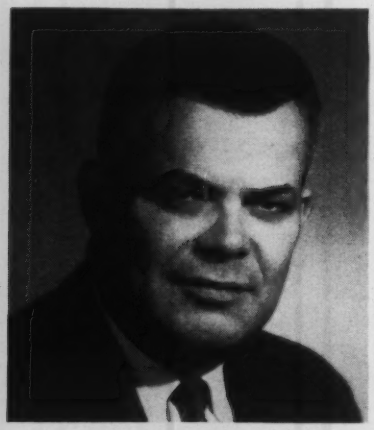
Armco Steel Corp.—**R. M. Nein,** appointed superintendent, cold strip mill, Middletown Works.

Universal Atlas Cement Div., U. S. Steel Corp.—**J. E. Taylor,** appointed asst. to the vice president, General Sales Div.

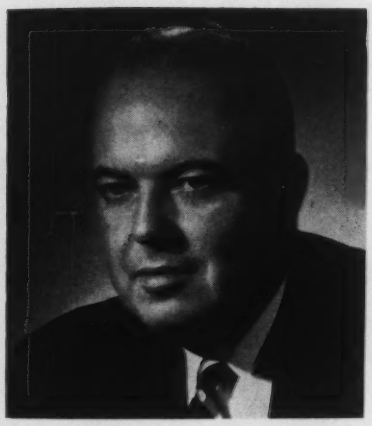
ALCO Products, Inc.—**Dr. W. K. Stromquist,** appointed chief, plant systems engineering, Nuclear Power Engineering Dept.



Thracy Petrides, appointed director, government programs, U. S. Industries, Inc.



G. A. Saar, appointed asst. general manager, Industrial Equipment Div., Allis-Chalmers Mfg. Co.



W. M. Wallace, named vice president and general manager, Industrial Equipment Div., Allis-Chalmers Mfg. Co.

The Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div.—**J. J. Kilcoyne,** named superintendent, Weaving Mill, Palmer, (Mass.) plant.

U. S. Steel Corp., Columbia-Geneva Steel Div.—**D. W. Lasell,** becomes general superintendent, Pittsburg, Calif., works; **E. C. Kinyon,** becomes general superintendent, Torrance Works in Southern California.

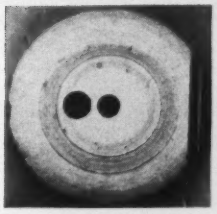
Reynolds Metals Co. — **L. T. Sanders,** promoted to central region consumer sales manager.

The Cleveland Cap Screw Co.— **L. G. Johnson,** named Northern California district sales manager.

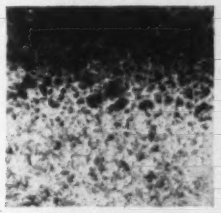
C. G. Collingwood, appointed assistant to the president, Air Products, Inc., Allentown, Pa.

JONES & LAMSON
OPTICAL COMPARATORS

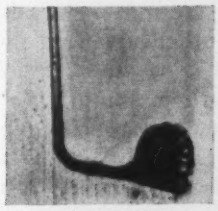
the man who needs a new machine tool is already paying for it



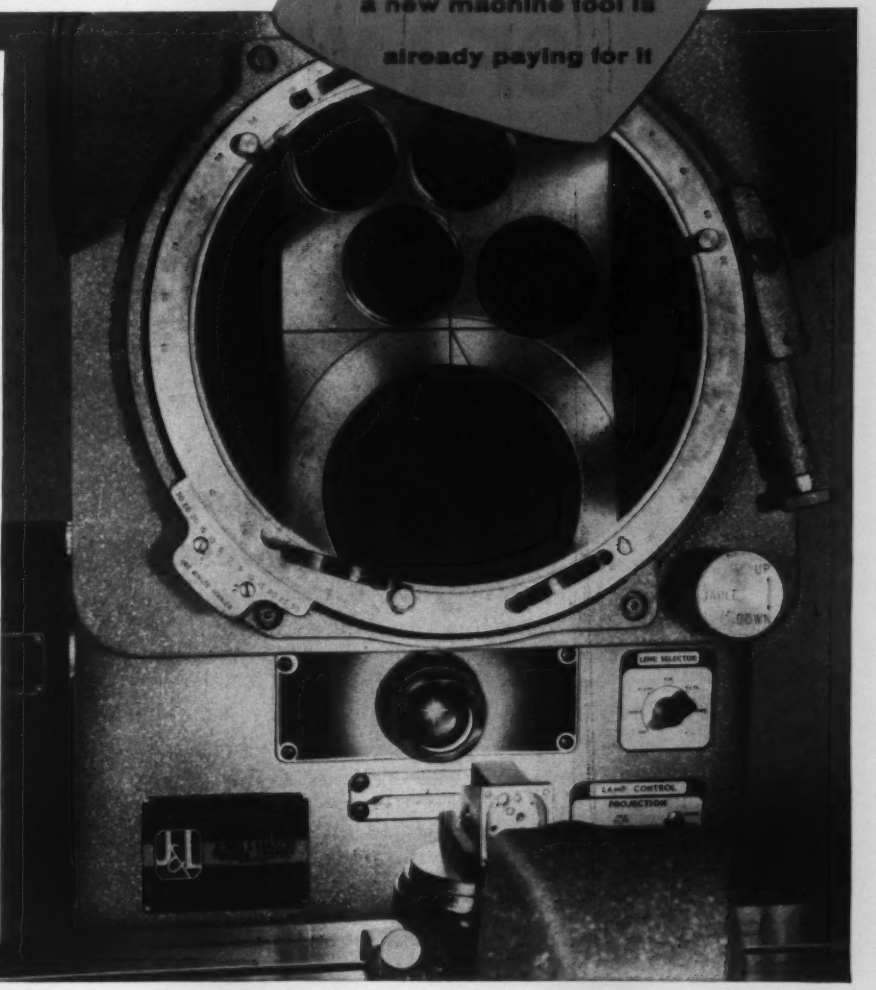
Two small holes inspected at bottom of 2½" deep hole.



Carburization and grain structure easily checked at 50X.



Sectioned specimen of fabric imbedded in rubber diaphragm.



New reflection unit makes "tough" inspections easy

Now, users of J & L FC-14 and TC-14 Optical Comparators can easily and accurately inspect cast materials, deep holes, and penetration of heat treat, and can make their over-all inspection operations more efficient than ever before.

J & L's new Normal Reflection Unit, shown here, is designed to produce the maximum amount of reflectivity, *regardless of the surface finish of the part being inspected*. This new unit gives brighter-than-lifelike images, with clean, razor-sharp definitions, without heat and without distortion.

This revolutionary development makes it possible to inspect by reflection and by projection simultaneously. Reflection can be directed from above, below, or either side. Effective light is increased at least 55% by means of a spherical reflector, which concentrates and redirects light into the optical system.

With J & L's True Telecentric Lens System, depth of focus of up to .100" can be obtained. And the image does *not* change size during focusing! The entire unit, is externally mounted to isolate convected heat from the optical system.

Write for free, illustrated folder LO-5918. Jones & Lamson Machine Company, 511 Clinton Street, Springfield, Vermont.

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Advance Progress Report

CF&I-Wickwire develops DOUBLE

New wire drawing technique gives you longer-lasting wire rope

CF&I-Wickwire's premium wire rope – Double Gray – has now been improved by a remarkable new wire drawing technique. This new wire rope – Double Gray-X – provides EXTRA LONG LIFE.

Wickwire's advanced wire drawing process is the joint effort of our research engineers, metallurgists and key production people. They sought to reduce the friction between the wires within the rope itself, thus producing a wire rope with greater resistance to bending fatigue. An important step in Wickwire's new wire drawing process is the use of *molybdenum disulphide.*

"Moly Disulphide" builds a thin, permanent molecular shield around each wire. Coupled with Wickwire's other advanced wire processing techniques, it gives these results:

- *Friction-free interaction of the individual wires in every strand of Double Gray-X* – A molecular jacket of Moly Disulphide on each wire helps cushion them against the effects of bending, crushing and abrasion. As the rope operates over sheaves, for example, the molecular shield tends to prevent the wire surfaces from grinding against each other, reducing friction and wear.

a superior wire rope

GRAY-X

- *Smoother surface to the wires*—In any wire, tiny imperfections occasionally form on the surface. These "weak links" can cause premature breaking of the wires and impair the life of the rope. Moly Disulphide helps eliminate any minute nicks, creating smoother-surfaced wires.
- *Higher degree of toughness which is essential to longer wire rope life*—Moly Disulphide greatly minimizes the friction involved in the drawing operation, thus preventing the wires from "heating up". This assures the correct physical properties for every wire in Double Gray-X and helps the wire retain its original toughness.

Double Gray-X will be made in a wide range of sizes and constructions to give greater operating economy and reduced downtime for all types of rope-using equipment. It will be available soon from CF&I-Wickwire's chain of warehouses and through a network of nationwide distributors.

EXTRA STRENGTH

In addition to longer life, Double Gray-X gives you the extra strength of Double Gray Wire Rope. Made of extra improved plow steel with an Independent Wire Rope Core, this rope gives 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.

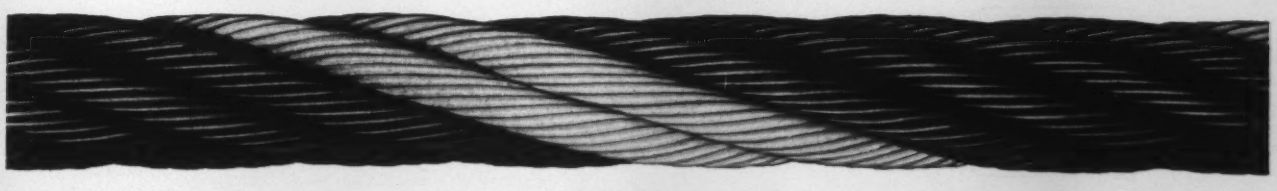
7484

WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa (Tex.) • Oklahoma City Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita
In the East: **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia



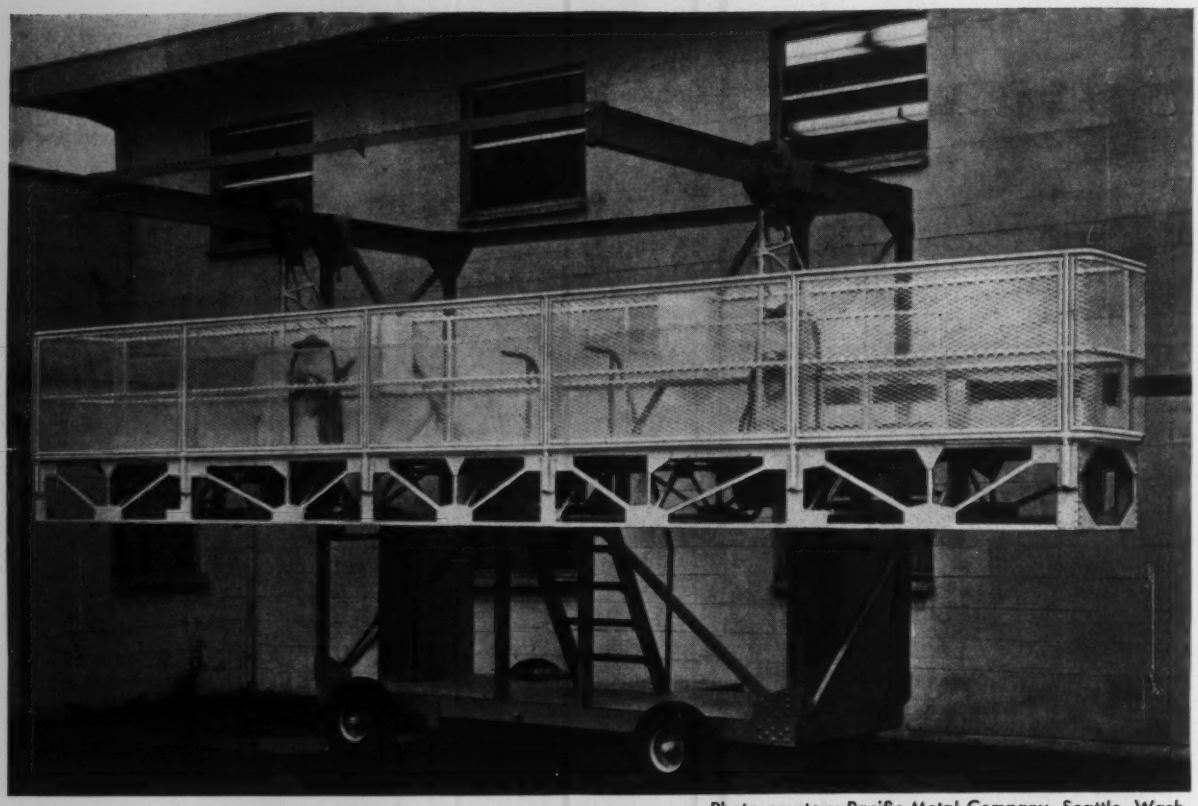


Photo courtesy Pacific Metal Company, Seattle, Wash.

SAFER, STURDIER STAGING

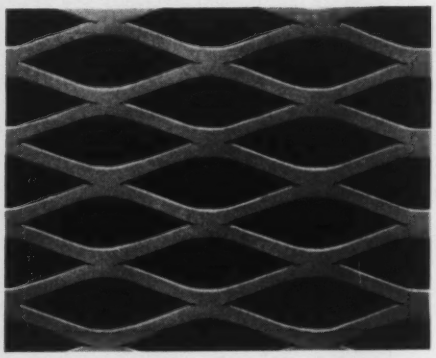
with expanded aluminum from a Steel Service Center

Power staging, manufactured by Spider Staging, Inc., Renton, Washington, is used for maintaining the exteriors of modern office buildings. This company's newest unit incorporates fencing of Penmetal expanded aluminum, which offers many advantages over the heavy fiber netting previously used.

Its rigidity provides superior security for the workers as well as added structural strength for the staging. Corrosion-resistant, it will never need replacing or refinishing, will keep its handsome new appearance for years. What's more the mesh chosen has openings small enough to prevent tools from falling into space.

The expanded aluminum for this product was purchased from a local *Steel Service Center*. Representatives assisted in the selection of the most efficient mesh for the job. And, as is the habit with *Steel Service Centers*, the order was processed promptly.

Want personal attention on your expanded metal needs by specialists who make your problems their own? Write direct to Penn Metal Company for the address of your local *Steel Service Center*.



Penmetal expanded aluminum used for the fencing in this staging was ½" mesh flattened.

STEEL SERVICE CENTER INSTITUTE

PENN METAL COMPANY, INC.

Expanded Metal Sales Office: P.O. Box 1460, Parkersburg, W. Va.
Executive Offices: 40 Central Street, Boston 9, Mass.
Plant: Parkersburg, W. Va.
District Sales Offices: Boston, New York, Philadelphia, Pittsburgh, Chicago, Detroit, Dallas, Little Rock, Seattle, San Francisco, Los Angeles, Parkersburg, St. Louis

PM-241

How to Use Break-Even Charts In Your Decision Making

By S. A. Tucker—Partner, Martin & Tucker, Little Neck, N. Y.

That new wing to your plant might be just the thing to increase output capacity. But look before you leap.

A lot of valuable information is contained in a break-even chart. It's an aid to sound decision making.

▪ Your company may be large or small. But regardless of its size, a time comes when major decisions must be made. How they are made affects your future in three ways.

If the decisions are sound, the big job of improving the profit picture will be that much easier. Secondly, they will put your company in a better position to compete. Finally, your business will have a better chance to survive recessions.

Break-even charts test in advance the effect of management's decisions. The charts put you in a position to gage the business course and to pre-judge the impact of certain moves and changes.

Purpose—What will break-even charts tell you? They disclose the impact of reduced prices and staff additions. The charts also point up the effects that might result from adding equipment and changing product mix. The charts will also tell you how and when to marginally price.

To construct a break-even (B-E) chart, you must divide company expenses into two parts: fixed and variable. Of course, variable costs change with volume, like materials and direct labor. Fixed costs, on the other hand, remain the same (depreciation, rent, etc.).

Some expenses have portions of each. Supervision is a good example. The diagonal in Fig. 1 is the sales line. The horizontal base line is the sales capacity, while the left vertical line takes care of expenses.

Stays the Same—Using the data presented, the dotted fixed expense line retains the same value for all sales levels. The total expense line is drawn from $320,000 at zero sales to $1 million at maximum sales.

The B-E point is that point at which the total expense and sales lines intersect. In this case, it's $740,000. At this point, there are no profits or losses. Profits come into the picture whenever volume rises above this point. Below it, you meet losses.

When the B-E point rises, the company has to sell more to maintain its level of profit. Sometimes the rise makes the company vulner-

What Is a Break-Even Chart?

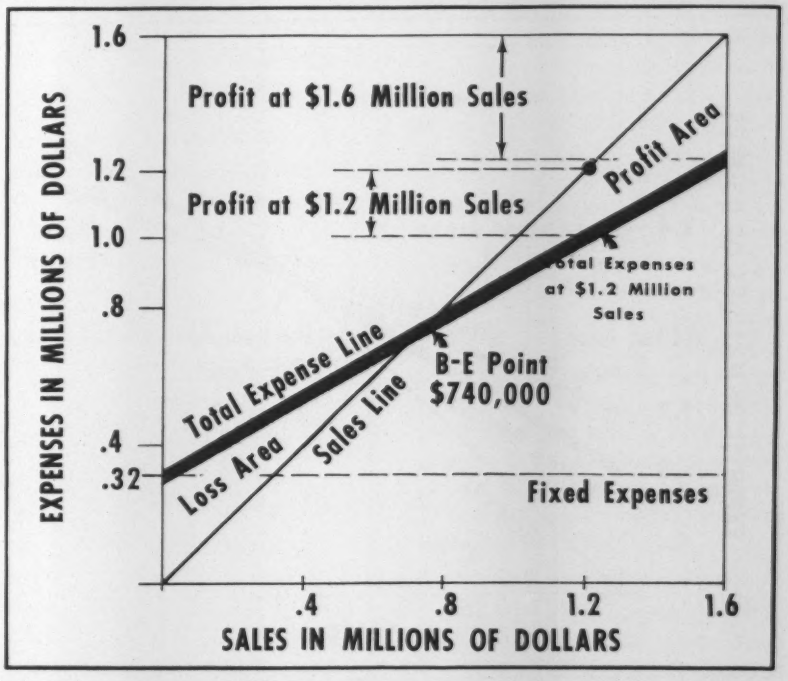


FIG. 1: Typical break-even chart shows the B-E point at $740,000. When volume rises above this point, profits are made.

Plan Before You Expand

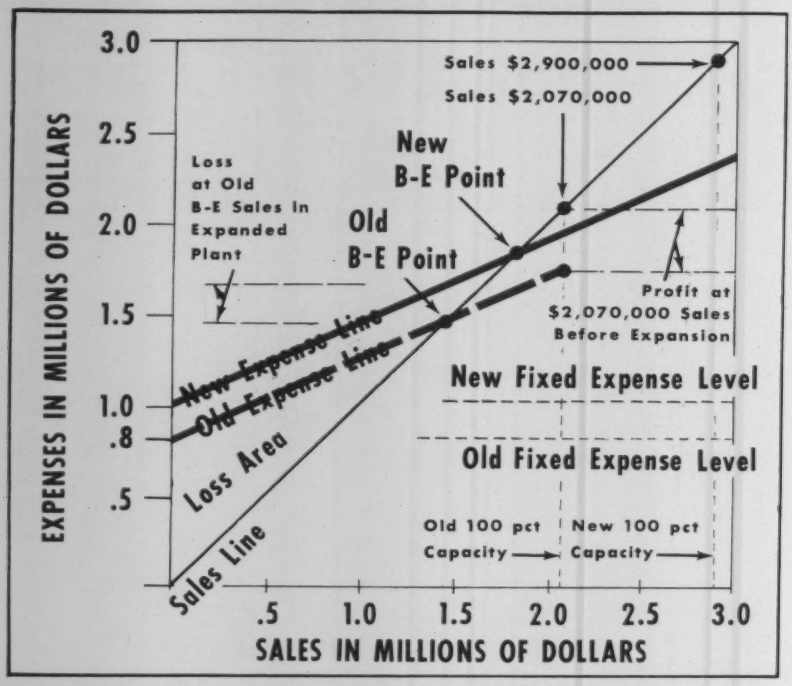


FIG. 2: To justify a 45-pct increase in equipment, a company would have to boost sales by $390,000. Caution should be a by-word.

Keeping the Same B-E Point

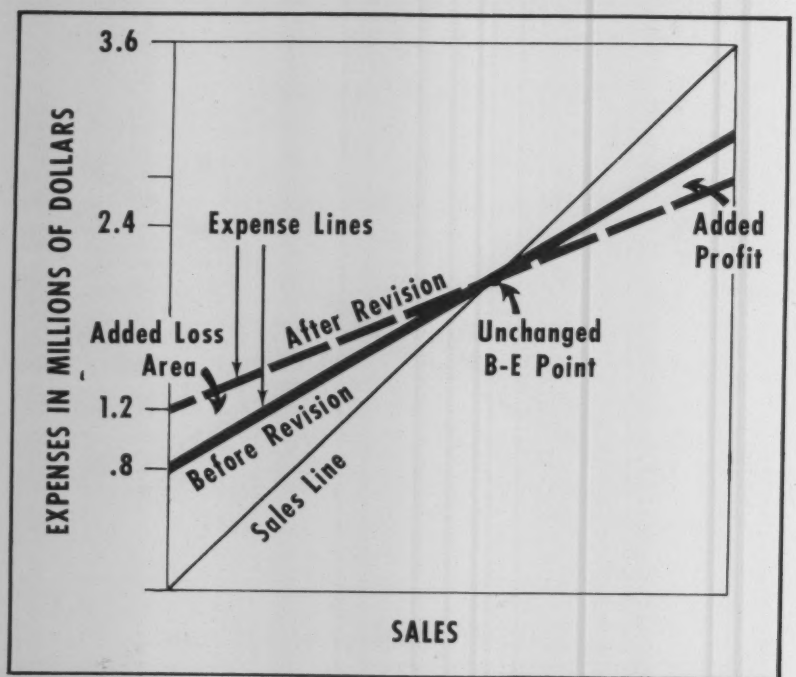


FIG. 3: Expansion can be made without increasing the B-E point. The trick is to increase fixed expenses and reduce variable expenses.

able to price reductions. It might impose psychological pressures that lead to desperate pricing and poor judgment. For these reasons, it's best to test decisions in advance.

Loading Up—Adding equipment, more personnel or shifting the product mix can raise the B-E point. This may be good or bad. It depends on the state of the company and how the move affects both expenses.

Figure 2 shows the before and after B-E points of a company that expands its capacity by 40 pct. Its fixed costs are $800,000 and its variable costs $931,500 or 45 pct of sales. Its present maximum sales level is $2,070,000 and its B-E point is $1,450,000.

Getting 40 pct more capacity with added equipment would raise fixed expenses to $1 million—25-pct increase. The variable costs would still remain 45 pct of sales, which is now planned at $2,900,000. The new B-E point would be $1,820,000—an increase of $370,000 over the old B-E point.

Sales Push—The profit at full capacity before the expansion was $350,000. With the load of added equipment, sales would have to be $2,460,000 (instead of $2,070,000) to make this same amount of profit. That means that there must be an increase in sales of at least $390,000 to justify the proposed expansion.

What happens if the company does not get the increase it expects after it decides to expand? Suppose sales don't go above the old maximum of $2,070,000? Then the profits would be only $138,500.

If sales dipped slightly more, there would be a loss. Like so many companies who boosted the level of their fixed expenses, this company was almost stymied. Only major surgery could set it straight.

Never Touch It—Some expansions are made without a change in the B-E point. Figure 3 shows what happened to a company before and after its expansion. Notice that while the fixed expenses rose

50 pct as a result of the increase, this was offset by a one-third reduction in the variable expenses.

As long as the company believes that its normal sales volume will not fall below its B-E point, all volume over this point produces a greater profit than the company enjoyed before the expansion.

The B-E chart also shows the ability to cope with competition. Figure 4 shows the data of two companies in exactly the same industry, making the same profit at maximum capacity.

Full Speed Ahead—Company A bought new equipment as a cure-all for higher profits, had excessive administrative expenses, and obtained low productivity in their manufacturing or processing. Company B used older equipment, squeezing every last cent out of it. It farmed out some of its production work, and maintained a tight control on methods and costs.

Company B's B-E point was $300,000; Company A, $618,000. When sales volume was at $300,000, Company B was not gaining or losing. But Company A was losing $320,000 in profits.

To survive in recessions, Company A would have to sell off equipment, cut out administrative activities and improve operations. Company B would not have to worry about these moves. Why? Because the larger portion of its expenses is variable and easily adjusted to volume dips.

How Expenses Affect Profit

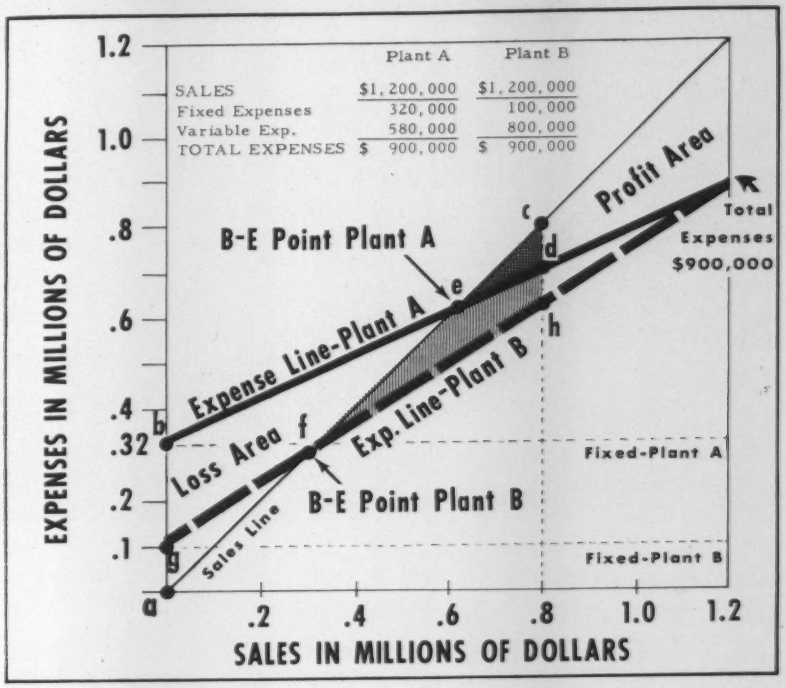


FIG. 4: Company A pushed its fixed expenses to dangerous heights. Company B chose a safer road as a defense against recessions.

Risk—Look at the differences in vulnerability—the balancing between risk and gain. At $800,000 in sales, Company A's gain wedge is shown in the dotted area of the chart labelled d-e-c, obtained at a risk of a-e-b. Company B has a more sensible operation. It gains the zone h-f-c by risking wedge a-f-g. So Company A gains over the $1,200,000 sales level only.

A proportioning between the fixed and variable cost elements is necessary in planning for the longer term. A lower total expense alone does not protect a company against pitfalls. The table shows the data for two companies. The one with a higher total expense also has the lower B-E point.

Both companies are in the same industry and make a similar line of products. However, Company Y has fewer hand operations than Company Z. While Z uses and pays more labor per unit, it keeps itself more elastic. It doesn't have large investments in equipment like Y. Instead, Z uses production wage incentives to boost output.

Guard Against Recessions

	PLANT Y	PLANT Z
Sales	$12,000,000	$12,000,000
Fixed Expenses	4,000,000	2,000,000
Variable Expenses	5,000,000	8,000,000
Total Expenses	$9,000,000	$10,000,000
Net Profit before taxes	$3,000,000	$2,000,000
	VULNERABILITY	
At $7.2 million	$200,000 (profit)	$400,000 (profit)
At $4.8 million	$1,200,000 (loss)	$400,000 (loss)

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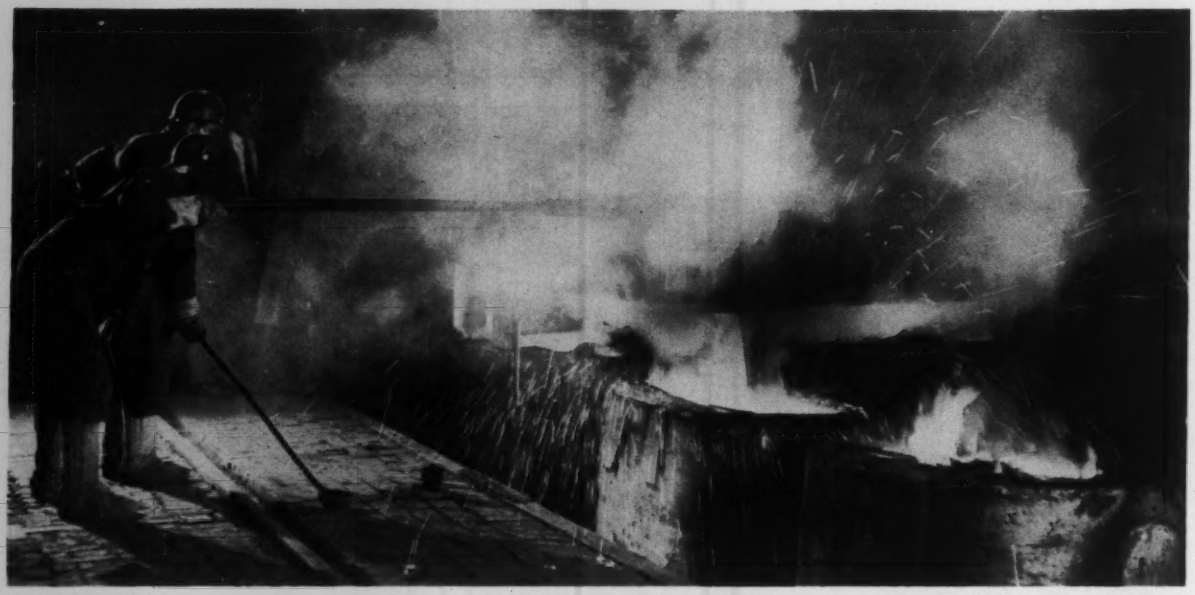


BIG END IS DOWN: With sideboards, steel can be poured with big end of mold down. Stripping is easy and there is less wear on molds. Ultrasonic tests show that slabs produced are sound throughout.

Sideboards Supply Extra Heat To Boost Ingot Yields

Exothermic sideboards, placed inside the steel ingot mold, reduce size of cavity to be cropped away.

Also, ingot can be poured with the big end down.

By G. J. McManus—
Pittsburgh Regional Editor

▪ Exothermic sideboards for slab ingot molds may soon bring major yield increases for makers of stainless and other alloy steels.

Developed by Pittsburgh Metals Purifying Co., the new method replaces hot tops with two molded boards (Soffel's Thermotomic Sideboards). The boards are placed inside the upper end of the ingot mold. When they are used, the ingot is poured with the big end down.

Test Stainless Types—The Brackenridge plant of Allegheny Ludlum Steel Corp. has used this method for more than 40 slab ingots. Stainless types 302, 304, and 430 have been tested.

According to R. Shaw, general melting superintendent at Brackenridge, results so far have looked like this: Yield from ingot to ground slab has increased 5 pct with the sideboards. Yield from ingot to furnished product has jumped even more. Ultrasonic tests have shown the slabs produced are sound throughout.

In addition, Mr. Shaw feels sideboards simplify the whole pouring and stripping operation. The boards can be placed in ingot molds by hand; crane service needed for hot tops is eliminated. There is no need to fuss with seals at the top of the ingot mold; and there are fewer shutoffs in pouring.

Big End Down—Other benefits result from the fact that steel is poured into a mold that has the big end down. Stripping is easier and there is less wear on molds.

Rapid stripping also reduces track time and conserves heat—resulting in less soaking pit time.

Effectiveness of the sideboards is attributed by operating men to the amount and location of heat generation. In normal hot topping, exothermic material is applied to the top surface or poured metal. Heat produced keeps the metal liquid and provides a reservoir within the hot top mold.

Loses by Cropping—As the ingot cools and shrinks, steel flows from

this reservoir to fill in center voids. The drainage leaves a V-shaped cavity at the top to be cropped away. On an 8-ton ingot, about 20 pct is lost through cropping.

In the method being tested at Brackenridge, there is the same layer of exothermic material on the top surface of the ingot. In addition, the exothermic boards are placed inside the ingot mold and apply heat at the sides.

As a result, say operators, the cavity at the top of the ingot is relatively shallow—more like a saucer than a V. This means less cropping and more yield.

No Internal Voids—The surprising thing about the new methods, says Mr. Shaw, is that ingots show no internal voids. The theory has always been that pouring stainless into molds had to be done with the big end up. If the largest mass of the steel was at the bottom—away from the liquid reservoir—voids would form and could not be filled.

At Brackenridge, ingots have been poured with the big end down and all have shown up completely solid in tests. Pittsburgh Metals says a special blend of exothermic materials helps produce these results.

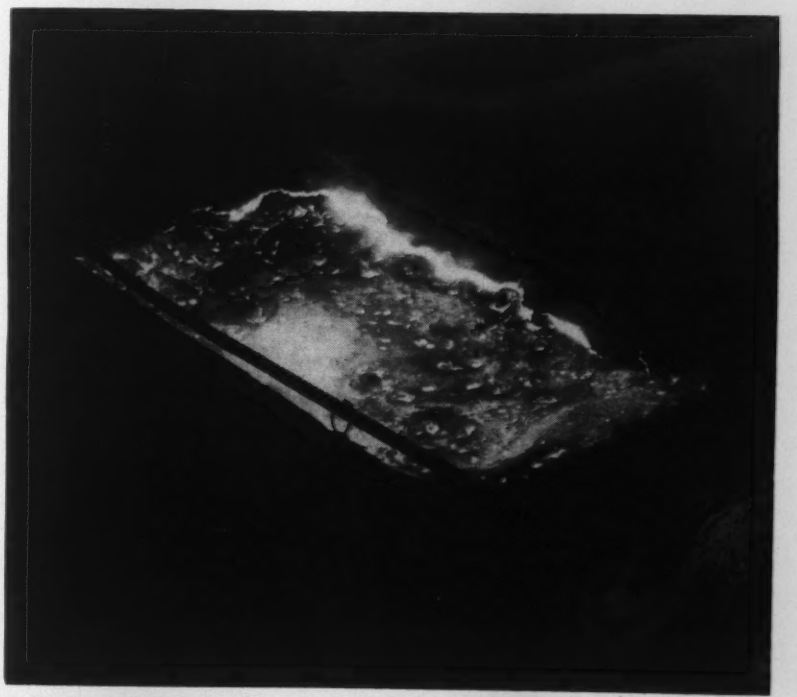
Increased Yield—In Allegheny Ludlum tests, sideboard costs have come to $1.50 a ton. This compares with a cost at the mill of $1.20 per ton of steel for brick hot tops.

But ingot mold cost with the big end up is reckoned to be about 40 pct per ton steel more costly than with sideboards and the big end down.

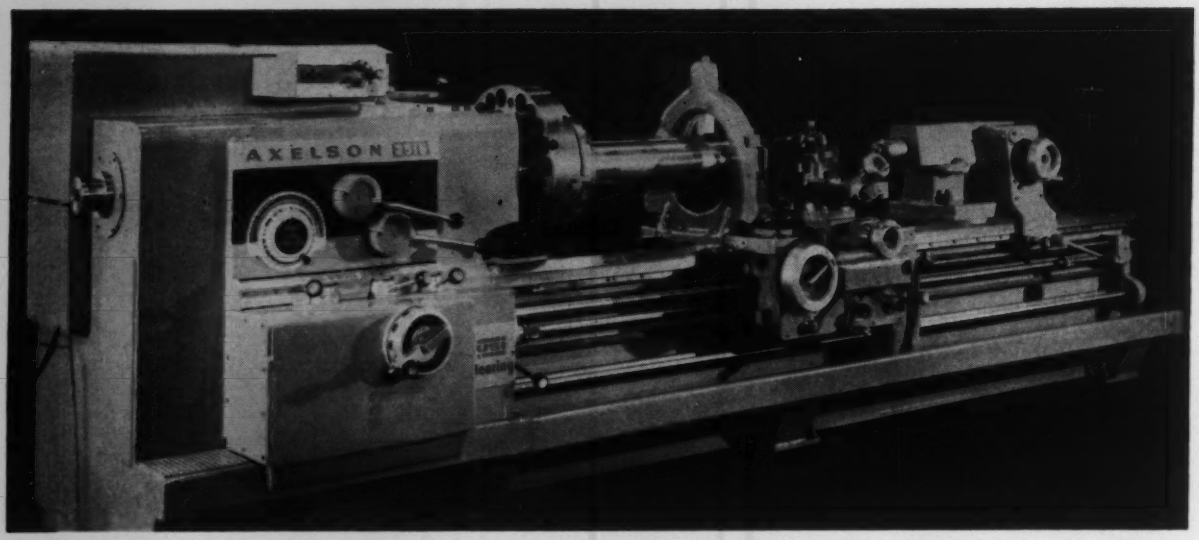
Savings from reduced track time and simpler preparation are considered significant. However, the big benefit cited for the sideboards is increased yield.

The 5 pct gain at the slab stage is exciting enough for a producer of expensive steels. When this is compounded through added processing, the gains indicated are really dramatic.

SIMPLE OPERATION: Exothermic sideboards are placed in ingot molds by hand. There is no need for crane service or seals at ingot-mold top.



SUPPLIES HEAT: Exothermic sideboards supply heat at the mold sides to give shallow cavity—more like a saucer than a V—at the top of the mold. This means less cropping and more yield.



WELDED LATHE: Headstock on engine lathe extends to the floor and contains basic driving devices.

Welded Design Offers Savings In Machine Construction

Quite a few companies are taking a closer look at welded design for machine bases.

Here are some tangible results in the changeover from casting to welding.

▪ Machine tool builders must stay on their toes to keep pace with today's demands from industry. This means producing units more accurately than ever before and in greater volume, too. Most crucial of all, however, is cost. It's the only way to ward off competition from abroad.

What is a good way to reduce costs? Some sober thinking along the lines of machine design might help. Quite a few good ideas came out of the recent Machine Design Award Program. This contest is sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland.

Each entry in the Lincoln contest was a redesign of a machine section that had previously been made by a method other than welding. For arcwelding to do its job, redesign is vital.

Sound Approach—You can't just start with an old copy of a base—then substitute steel for cast iron. You must start from scratch. Tailor your design to welding, not casting. If your design is practical, you'll reap the benefits of steel's strength, rigidity and vibration control.

Two engineers from The Heald Machine Co., Worcester, were able to simulate the properties of a finished steel machine base with the help of a plastic scale model. As the model underwent stress, photoelastic studies were made. Thus, they were able to bypass unneeded ribbing and bracing.

Heald engineers followed the concept of building block design. In essence, this method strategically places structural members into a metal base until enough rigidity is obtained. There's probably no better way to design a machine base into a compact, lightweight, rigid unit.

Same Traits—Studies are made by placing the transparent, plastic model (while under stress) in polarized light. Any refraction of light is in direct proportion to the degree of strain of the material. And any increase in the applied load results in an increase in "fringe" density.

Mating surfaces of the plastic model, joined by cement, take on the role of weld fillets. As these cemented sections dry and harden, they resemble the cooling and shrinking of steel welds. Like residual stresses can also be noted.

How did this approach affect the cost picture? One machine tool took 4½ weeks to build as a weldment. The same unit used to take 8 weeks with cast design. On the

same base, building cost for a cast type was $3316, as against $2682 for a weldment.

For Milling — Cleveland Twist Drill Co., Cleveland, used 18 major welded parts in building its new electro-hydraulic tracer-controlled milling machine. What was welded? The unit's bed-base combination. Key factor in this design was constructing the bed in separate sections and then assembling them afterwards.

The company reaps savings from several areas. For one, welded design reduced the cost of machining support pads for mounting the hydraulic cylinder on the underside of the bed.

The new design also eases the task of installing internal hydraulic tubing. Instead of working through small side openings, the tubing can be installed through the open bottom of the base during assembly. This short-cut trims 20 minutes from each hour linked to tubing installation.

Saving Time—Welded construction also permits housing a 60-gal hydraulic tank in the base of the machine. This feature saves one-half of the cost of an external tank, plus 8 sq ft of floor space.

Any leakage from the hydraulic tubing merely drops into the tank, preventing the floors from becoming too slippery. Welded design also sets the bed up as both an anchoring means and a manifold for the hydraulic lines. Based on five units, the new design led to savings of over $5000.

Lathe Design—Clearing Div. of U. S. Industries, Inc., Chicago, designed a new line of engine lathes. But the new units had to toe the mark. The company wanted the new lathes to be a thousand times more rigid. And they had to obtain a greater range of speeds with more closely spaced geometric steps. Increased horsepower was vital, too.

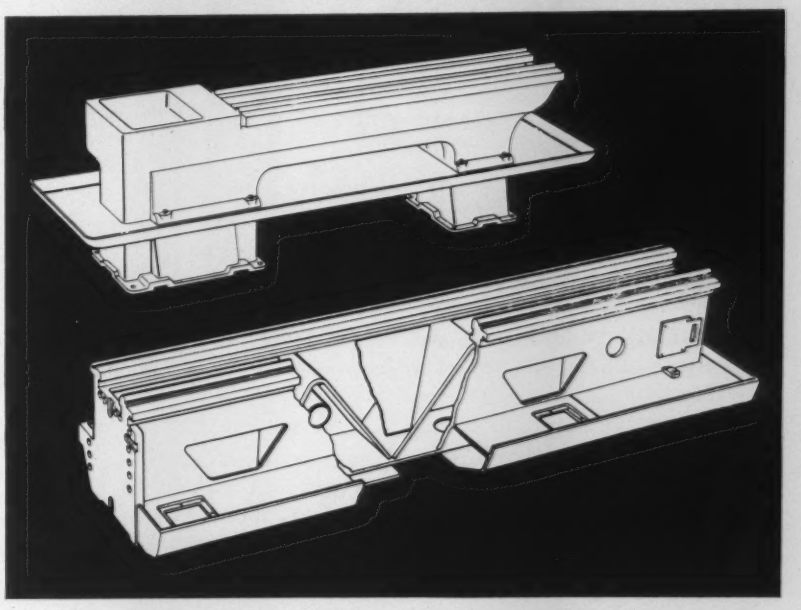
Clearing's design is a fresh approach to building block concepts. First of all, the headstock is extended to the floor. As such, it contains all the basic driving devices of the lathe in a single unit.

Clearing is saving between 12 and 14 pct in production costs using welded steel rather than cast iron design. These figures are based on lots of 30 engine lathes.

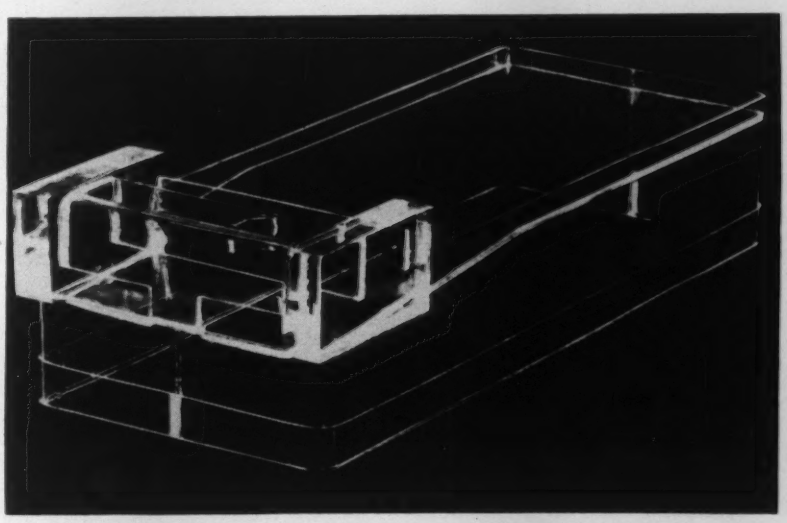
Arcwelding Again—A new 79-spindle nut tapping machine is fully arcwelded. This unit is a product of Zagar, Inc., Cleveland. Its two weldments are the base and the head. According to Zagar's chief engineer, strength and looks are designed right into the unit. Cost of the base weldment was $472, while the head cost $214.

In the redesign of a base for a

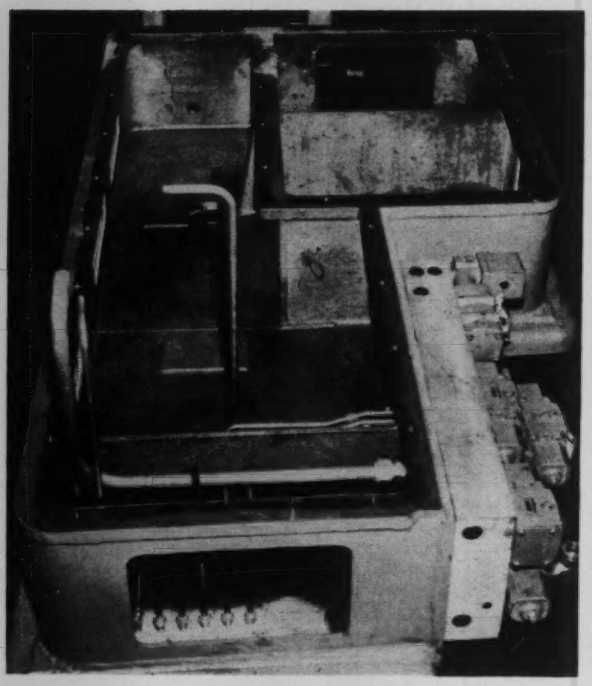
How Welding Improves Lines



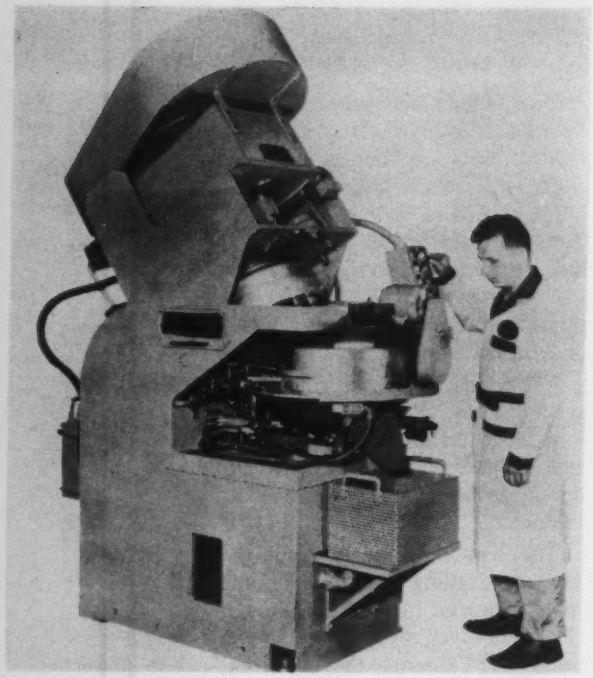
PRACTICAL LATHE: Welded design of steel engine lathe combines bed, chip pan and pedestals into single, integral unit.



SCALE MODEL: You can foresee many of the stresses your weldment will be subjected to by studying the effects on plastic scale models.



BIG SAVINGS: Welded design saved about $1000 on the bed-base of a special type of milling machine.



TAPPING MACHINE: The base and head of a new 79-spindle nut tapping machine is fully arcwelded.

beverage filling machine, Crown Cork & Seal Co., Baltimore, was faced with the problem of building machines in six different sizes. Each size required at least five basic castings in cast iron design.

The base or housing consists of three plates. The top plate is ⅝-in. A-7 steel, 75 in. square. The middle ¾-in. thick plate measures 36x75 in. The bottom plate is the same size as the middle plate, except that it's ⅝ in. thick.

Proper Shape—The plates were laid out in detail, torch cut and marked for identification purposes in assembly. Vertical wall members of the housing are ¼-in. plate. To streamline the weldment, front corners of the vertical wall were formed with an inside radius of 2 in.

The complete housing was first tack welded, then inspected before finish welding. Stress relieving followed final welding.

Machining time on a cast housing amounted to 102.6 hours. The one-piece weldment required only 86.6 hours—a saving of 16 pct. Weight was reduced 25 pct, from 3415 to 2560 lb. Material and labor costs dropped from $887 to $750. However, the cast iron figures doesn't include any allowance for pattern costs.

War of Costs—Oliver Machine Co., Grand Rapids, came up with a new bed design for a 5-ft woodworking and metal spinning lathe. The change from cast to welded design lowered material and labor costs from $47.25 to $24.52.

Weight of the unit fell, too. It now weighs 102 lb. It used to be 156 lb. Selling price of the machine is now 35 pct lower.

The bed's horizontal structural member is 2¾-in. seamless tubing of hot-rolled pickled and oiled steel with 0.120-in. wall. Standard ¾-x 2-in. flat cold-rolled bar stock is used for the ways.

Seven 6- x 6-in. stamped 5/16-in. plate cross members or gussets support the ways. The gussets are welded to the tubing and to the undersides of the ways. Two bottom plates at either end of the bed are stamped from ⅜-in. cold-rolled steel. These plates are drilled to permit bolt mounting on headstock and tailstock legs.

Even Dozen—There are only 12 pieces in the assembly. To avoid machining of the four side faces, the two ways are kept straight and equally spaced in parallel planes. There's no problem to surface grind the top faces of the rails.

The design confines cross member-to-tubing welds to the sides of the tubing. This leaves the top and bottom free of weld to avoid possible distortion in the plane kept straight.

Prior to welding, enough strength was built into the welding fixture to straighten the tubing. Thus, they could use standard tubing with commercial tolerance for straightness.

A welding fixture came in handy, too. It kept the entire length of the ways straight (within 0.001 in.) during welding.

Computer Acts as Design Tool

A "mother" computer helps design engineers produce second generation computers.

Data tapes replace 10,000 electrical drawings. "Noise problems" are solved before the new units are even built.

▪ Electronic data-processing helps to produce second generation all-transistorized computers at a record rate. This method takes the place of about 10,000 electrical drawings. Lists of tables and symbols, fed into the "mother" computer, replace the prints.

Substitution of computer-handled data for piles of blueprints cuts tedious drafting work. But, the real savings are in the speed, accuracy and agility with which the working computer handles the job. It eliminates months of blueprint handling.

Using this method, the Datamatic Div., Minneapolis-Honeywell Regulator Co., Newton Highlands, Mass., can trace a design change through the system in 12 hours. With previous methods, such a change required many weeks to effect.

Saves Valuable Time—Mr. W. W. Finke, president of the Datamatic Div., estimates that about six months—in the engineering and design departments alone—is now being saved.

The "offspring" computers are complex machines; therefore each must be an array of electronic devices. A single design or production error can't be tolerated. Of course, the chances of building errors into such a system are numerous. There're thousands of parts: Thousands of links join these parts together.

Achieving an error-free goal requires both mental and physical teamwork. The trick is to reduce the chances of error to the minimum before each unit is built.

Provides Design Data—A large part of any design work is really data processing. Realizing this, Honeywell engineers have invented computer methods which perform the same tasks as wiring diagrams. These methods fix the points of origin for 60,000 wires. They plot each wire's route to its destination. And they correct terminal positions.

By assigning this work to a computer, the engineers have a tool which improves their ability to reduce—in advance of actual construction—all "noise pickup" problems. These problems arise from wiring congestion inside the system. This is a prime bugaboo of computer design.

Without computer tables, it's impossible to anticipate all problems. The reason lies in the complexity of the machine's innards, and the sheer volume of drawings needed to describe them.

Now, all tables are recorded on tapes by the "mother" computer. Engineers pre-test for "noise pickup" and double-check each bit of wiring in a matter of hours. Days used to be needed to perform the same task.

Permanent Records—The working computer also helps to check out the time element circuits. Thousands of pieces of information, in the form of electronic signals, move through a large computer with split-second timing: accuracy is a must.

Time and cost of correcting a dozen errors can exceed the cost of designing the system. As a result of pre-testing in advance, the efforts needed for corrections have become almost nil.

An added benefit of the great volumes of data — on computer tapes — for each type and model may come later in the life of the systems. If customers need changes in the field this data will prove valuable.

SELF-PROPAGATION: Reels of magnetic tape solve production problems.

Radiant Energy Solves Problem Of Warehouse Heating

By R. F. Sharon—Manager, Panelbloc Div., The Bettcher Mfg. Corp., Cleveland

Infrared radiation provides low-cost, efficient heating even when the building is old and drafty.

Other advantages: minimum maintenance; no danger of shutdown due to power failure.

When the Parts Div. of Thompson-Ramo-Woolridge Inc., Cleveland, expanded its warehousing facilities into an older building, a dual problem arose. The existing heating system was uneconomical. Also, Thompson had only a short-term lease, and, naturally, wanted to limit its heating investment.

Infrared radiant heating was the answer. The division not only obtains low-cost heating with a small investment but receives several other important benefits.

Structure Was Old—The building, erected 40 years ago, was designed for use as a maintenance building and garage for trucks. When Thompson leased it, it had been vacant for a year and a half.

The existing heating plant was an old-fashioned, hand-fired, high-pressure boiler. To operate it would require a man on duty around the clock, and a total labor cost of about $24,000 a year.

"This cost," says Howard Carl, maintenance foreman of the Parts Division, "was too much for us to live with. We immediately looked for other ways to heat our 31,000 sq ft of warehouse space."

What They Found — By using gas-fired, infrared, radiant heaters, 10 pct of the installation cost, as compared to the next cheapest heater, could be saved. And the estimated annual fuel bill is 12 pct less.

Made by Panelbloc Div., Bettcher Mfg. Corp., Cleveland, the installed cost of the heaters was $8800. The estimated yearly heating cost is $3300.

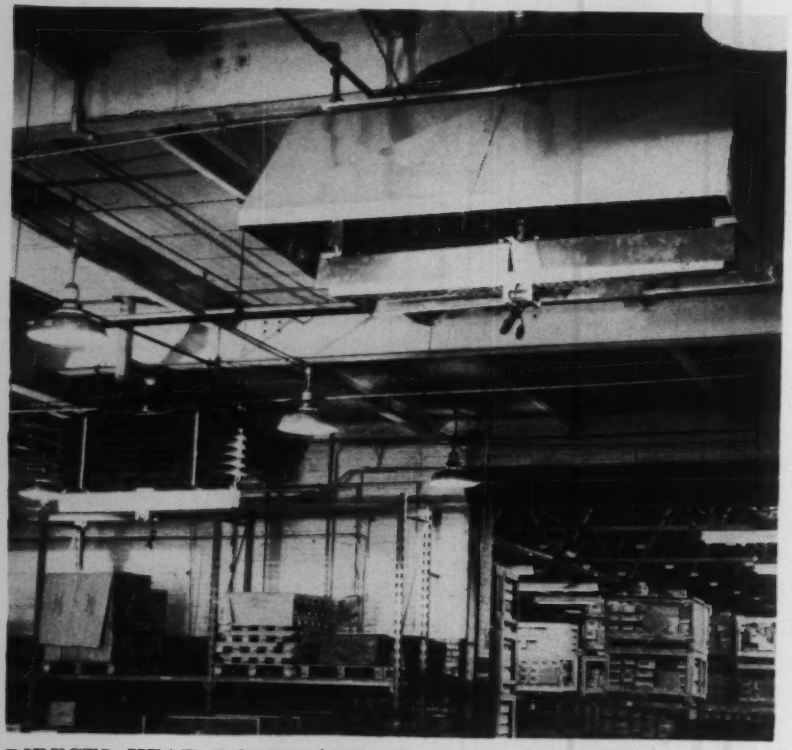
The Panelbloc heats like the sun. Infrared radiation, emitting from the heater, warms whatever it strikes—people, equipment, floors.

Acts Like Light — Radiant energy follows the same laws as light energy. It can be aimed like a flashlight, and it can be reflected and focused by metal mirrors like light. It passes through air at the speed of light without losing energy to the air through which it passes.

When radiant energy comes in contact with a solid object, most of it is absorbed and converted to heat; the rest is reflected away.

But radiant energy is more efficient than the sun because much of the sun's radiation is wasted in visible light. Why? The percent of radiation absorbed depends on the wavelength of the radiation which, in turn, depends on the temperature of the source. Lower temperatures generate longer waves which are more readily absorbed.

Reflects Radiation — In the Panelbloc, gas burners heat a steel heat exchanger. This unit, which is



DIRECTS HEAT DOWNWARD: Panelblocs are mounted above the floor in a preset pattern to assure workers are always under warming rays.

coated inside and out with vitreous enamel, is the radiation source. (This coating has a high—95 pct—emissivity at 725°F.) Aluminum louvers with bright, polished undersides reflect the infrared energy to the floor in a preset pattern.

It takes only sixteen Panelblocs to heat the entire warehouse area, two adjacent bays each about 70 x 160 ft. Each unit has an output of about 100,000 Btu.

The Panelblocs, mounted 14 ft above the floor, are arranged so that nowhere in the warehouse is the worker out from under their warming rays.

Low Heat Loss — Ceilings are high in the warehouse—40 ft at the peak of the roof. But there is no waste of heat due to hot air rising to warm the unused upper parts of the building. The reason: infrared doesn't heat air.

Panelblocs heat the floor first; the floor then becomes a secondary radiator of heat. Thus, workers are sandwiched between the direct rays of the radiant heater and secondary radiation from the floor for complete comfort.

Five radiant heaters are used to heat the receiving area, which comprises about 5000 sq ft. Because the Panelbloc does not heat air, infrared radiant energy cannot be diverted by cold drafts.

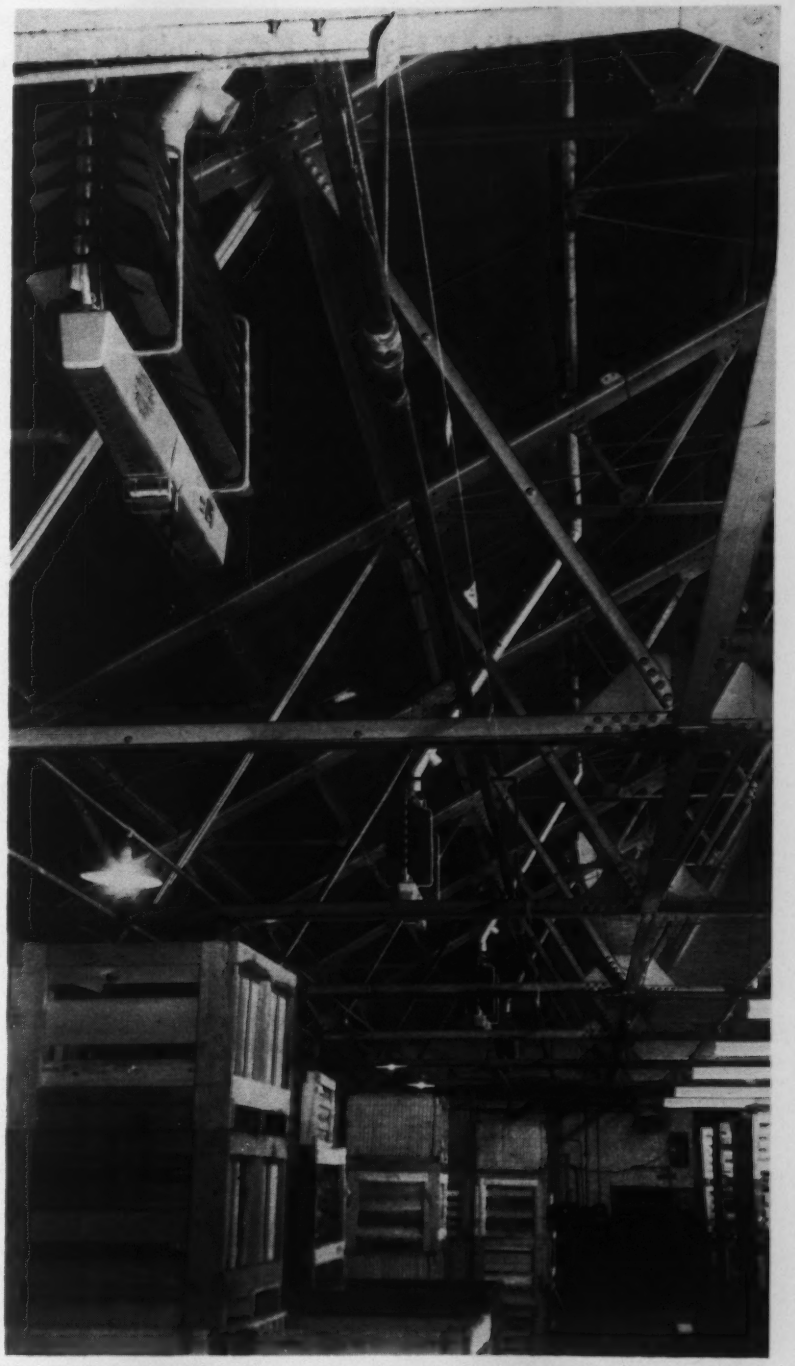
A special hood is used with the radiant heater above the foot of the ramp where trucks come into the receiving department. This insures that workers will stay warm even though the building door is wide open. The heaters in the receiving area are only 10½ ft above the floor.

Maintains Warmth — Thompson sets the thermostats of the radiant heaters at 70°F. The 21 radiant heaters in the building have enough capacity to maintain this temperature even when the outside temperature is 0°F.

A pilot light keeps the heaters always ready for use by generating enough thermo-electric current to actuate the gas valve. This makes it possible to use either a thermostat or manual switch to start and stop the unit. No external supply of electricity is needed.

This was an important factor to Thompson since disconnecting and connecting electrical lines would add to expense should it move the heaters to another warehouse.

Maintenance is at a minimum because there is no fan, no motor, and no moving parts. And there is no possibility of shut-down due to power failure.



NO WASTE HERE: High ceiling area in building needs no warming. With radiant heaters, there is no waste of heat due to rising hot air.

Radial Drill Trepans Graphite

Bores Through 2-ft Section in Single Operation

There are advantages to making cast steel wheels from graphite molds. The real art of preparing the molds is in proper trepanning.

▪ It took 10 years of research for one company to develop a graphite mold process that refined its production of cast steel wheels. The end product is used on railway freight cars.

As a material, graphite has many desirable traits. But, because graphite erodes easily, the company was forced to adopt a special pouring technique.

How It's Done—At the Muncie, Kans. plant of the Griffin Wheel Co., metal is forced into the mold through its bottom by air pressure. The rate of this pressure must be closely controlled—about 60 lb per second.

As soon as enough metal has entered the mold, an air-activated plunger goes into action. A graphite plug fits onto one end of the plunger.

The setup then pushes automatically through the molten metal and is seated in the drag. The plug keeps the metal from running out of the mold as the air pressure is shut off and the tank is exhausted.

The Switch—There was a big problem in making the drag and plunger holes in the mold halves. Why? In a single operation, Griffin would have to trepan a 5-in. hole through 24 in. of solid graphite.

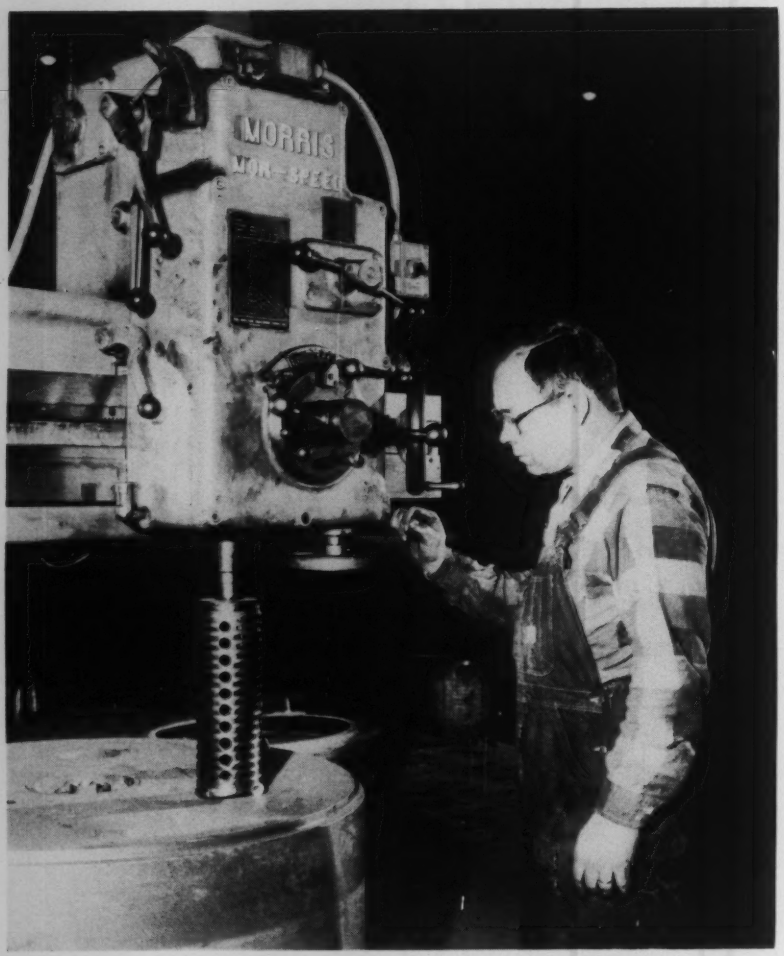
Griffin is now trepanning the holes with a 9-in. column heavy-duty radial drill equipped with an unusually large trepan tool. The equipment is a product of the Morris Machine Tool Co., Cincinnati.

The drill runs at a spindle speed of 225 rpm, with a feed rate of 0.006 ipr. The drill is available with standard speed range of 75-2000 and 110-3000 rpm, and a feed range of 0.004 to 0.025 in. Also, there's a special suction system to remove graphite dust.

All the Earmarks—The Morris radial drill has the needed ingredients for this tough job. It's rugged. And it has the massive rigidity. Its balance, together with its accurate spindle speed and feed, insures maximum operating efficiency.

The unit used at Griffin has a 4-ft arm. The same 9-in. drills are also available with 3-ft arm drills. Light-duty 9-in. column drills come in 3 and 4-ft models. There's a wider range in 11-in. column models—3, 4, 5 and 6-ft arm models.

All models feature centralized controls and fully-enclosed elevating device with electric column clamp. To insure safe, easy operation, a roller-bearing mounted head is also included.



EFFICIENT TOOL: A 9-in. column radial drill is the tool that trepans a 5-in. hole through 24 in. of solid graphite.

NEW FROM WESTINGHOUSE

WHY YOU SHOULD CONSIDER

ULTRASONIC CLEANING

Compared with other cleaning methods, Westinghouse ultrasonic cleaning does away with scrubbing and disassembly . . . can be done right on the production line . . . in most cases will pay for itself in less than a year

See following pages for the complete story

Westinghouse ultrasonics cleans any hard material 2 to 10 times faster ... up to 100% more effectively

Westinghouse Ultrasonics will remove: Lapping compound, buffing compound, abrasives, oxidation, dust, oil, grease, rust, scale, metal chips, radioactive substances . . . almost any contaminating material.

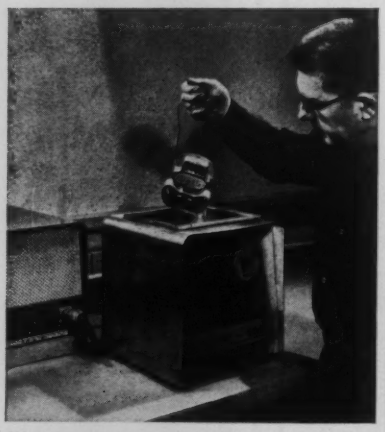
Westinghouse Ultrasonic cleaning is 2 to 10 times faster. Here's a typical example. A radioactive reactor part used to require 8 to 16 hours cleaning time and numerous baths in acid and alkaline solutions. Using ultrasonics the part was cleaned in *one hour.*

Westinghouse Ultrasonic cleaning is 39% to 100% more effective. Reaches where a brush won't fit, dislodges the stickiest, most clinging soil, cleans out hairline cracks, doesn't miss the tiniest speck.

Westinghouse Ultrasonic cleaning cuts costs. Eliminates hard scrubbing and multiple cleaning operations. Less tie-up of needed parts during cleaning. Ultrasonic cleaning is so fast it can actually fit into production-line operation.

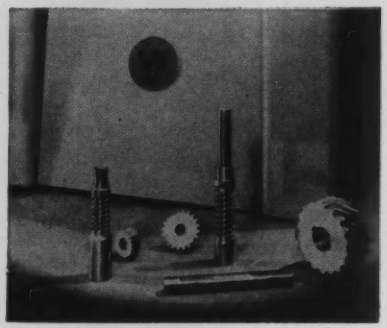
How Ultrasonic Cleaning Works. Ultrasonic cleaning is accomplished by pressure waves of supersonic frequency. Traveling through a cleaning solution, the waves create microscopic empty spaces in the liquid — "bubbles of power," that form and collapse 20,000 times a second. As they collapse, they create instantaneous blips of 20,000° temperature and 70,000-pound pressure. This sets up a scrubbing action, gentle because it is on a microscopic scale, that "blasts" the contaminating substance loose. No matter how tightly the layer of dirt or scale adheres, no matter how deep it is embedded, the steady "cold boil" action of ultrasonic cleaning breaks loose all foreign substances.

What does it take? An ultrasonic cleaning unit is made up of three parts: a generator, a transducer, and a cleaning tank containing a suitable cleaning agency — detergent, solvent, mild alkalies or mild acids, or, in many cases, ordinary water. The generator produces high frequency electrical energy, which the transducer changes into high frequency sound waves that vibrate the cleaning agent.

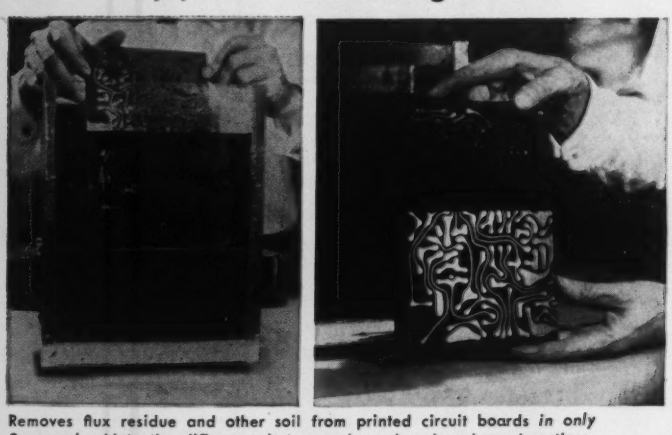


Watt hour meters can be cleaned in minutes — with up to 63% time savings on total maintenance operation.

Removing dirt, chips, cutting oils and buffing compounds from parts that previously required hand brushing.



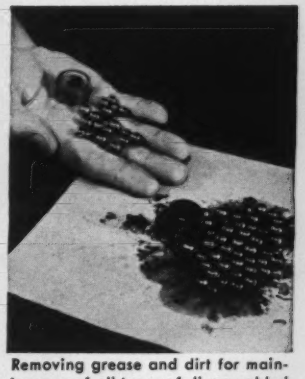
Some of the cleaning jobs that Westinghouse ultrasonic equipment is now handling . . .



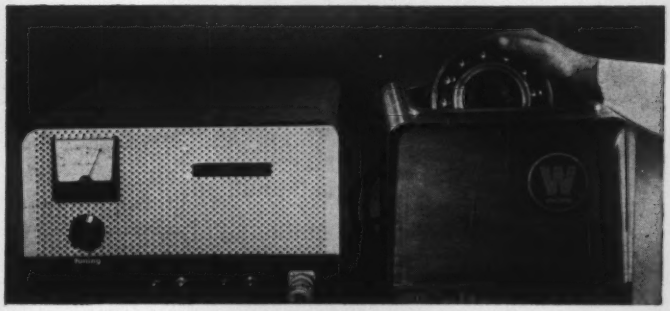
Removes flux residue and other soil from printed circuit boards *in only 2 seconds.* Note the difference between cleaned and uncleaned sections.

Why Westinghouse ultrasonic cleaning units are better

Removing foreign matter from jewels and bearings of all types of meters during manufacture and maintenance.

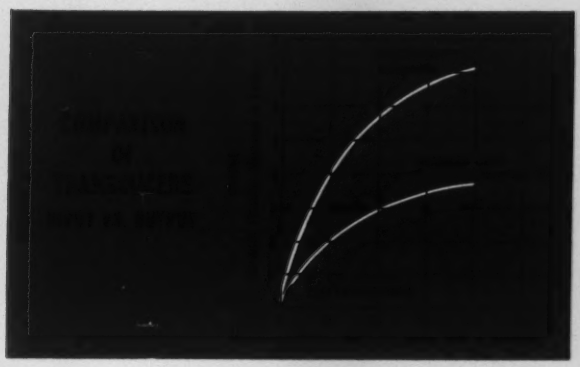


Removing grease and dirt for maintenance of all types of disassembled bearings. No particle of foreign matter remains after ultrasonic cleaning.



Removing accumulation of grease and dirt for maintenance of bearings and other complex mechanical assemblies.

WESTINGHOUSE ULTRASONIC CLEANING UNITS range from 1½ to 16 gallon capacities in standard sizes. Custom-designed cleaning units can be made for special applications. Above is a 300 gallon unit for complete immersion of large items.



The heart of every ultrasonic cleaning unit is its transducer. Here are the advantages of the Westinghouse Magnopak transducer.

- Gives twice the usable ultrasonic power of other transducers for the same electrical output.
- Can be safely driven to power intensities three to four times higher than the toughest electrostrictive transducers.
- Provides equal distribution of power — with no "hot" or "dead" spots on the plates.
- Is matched acoustically to the cleaning bath.
- Requires no special cooling.
- Covers the entire bottom of the cleaning tank and therefore affords equal cleaning power in any part of the tank.
- Has no moving parts or tubes and the equipment size has been cut 80% through the use of solid state devices.
- The ultrasonic generator features the 50% more efficient solid state trinistor circuit. The stainless steel transducer-tank is electrically matched to the generator.

YOU CAN BE SURE...IF IT'S **Westinghouse**

J-35011-1-3

FIND OUT HOW WESTINGHOUSE ULTRASONIC CLEANING EQUIPMENT CAN HELP YOU . . .
Mail this coupon to:

Westinghouse Electric Corporation
Industrial Electronics Department A-30
2519 Wilkens Avenue • Baltimore 3, Maryland

Please have a Westinghouse ultrasonic representative telephone me_____.

Please send me further information on Westinghouse ultrasonic cleaning techniques_____.

The product I want to clean is_____.

Please send me your recommendations on equipment_____.

NAME_____

POSITION_____

COMPANY_____

STREET_____

CITY_____ STATE_____

New Catalogues and Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 105.

Welding Data

Presented on a metal-edged wall chart are data of value to users of resistance - welding electrodes and accessories. The colorful wall chart supplies information on: R.W.M.A. specifications for spotwelding similar and dissimilar metals, projection-welding data, conversion data on commonly - welded metals, spot-welding and seam-welding schedules for low-carbon steel. The 20½ - x 29½ -in. chart also includes information pertaining to heat balance, secondary amperes and electrical force, and average properties of high productivity alloys. (Ampco Metal, Inc.)

For free copy circle No. 1 on postcard, p. 105

Pendent Switches

Pendent switches are illustrated and described in an eight - page bulletin. Used for electrical-hoist control, the switches feature safety and minimum maintenance. The switches are encased in corrosion-proof, shock-resistant, water-tight synthetic rubber. They are available with two, four, or six buttons, with one and two speed control. (Joy Mfg. Co.)

For free copy circle No. 2 on postcard, p. 105

Cutting Fluids

Data sheets are available on a base cutting oil, and a water-soluble cutting fluid. The sheet on base oil contains information on operations and dilution; the sheet on the water-soluble cutting fluid presents a description of the fluid, which was developed for all machining operations in the metalworking field. (Fiske Bros. Refining Co.)

For free copy circle No. 3 on postcard, p. 105

Technical Meetings

The proceedings of 126 selected meetings, conferences, and symposia, held during the past 10 years in which the Atomic Energy Commission or its contractors were sponsors, co-sponsors, or major participants, are described and listed in a catalog. The 29-page publication groups the proceedings under 19 subject areas. (Technical Information Service Extension, United States Atomic Energy Commission)

For free copy circle No. 4 on postcard, p. 105

O_2 Measurement

For continuous measurement of O_2 in gases, an analyzer unit has automatic temperature compensation, yet uses no chemicals and has no moving parts. The analyzer has an accuracy of ± 1 to 2 pct of full scale and a stability of ± 1 pct of full scale over more than a year. A bulletin contains design features, specifications, principle of operation, and applications concerning this unit. (Milton Roy Co.)

For free copy circle No. 5 on postcard, p. 105

800 to 1 hp favorites for quiet operation, low maintenance and long-life service . . .

From the case of the A. O. Smith Motor Man — a complete stable of integrals that include single-phase models (1-5 hp) or polyphase (1-800 hp). Also a team of fractional-hp motors. All are sure bets to give top performance over the long, long haul.

And there's an A. O. Smith Motor Man near you — chomping at the bit to give you 24-hour action on all parts and service orders.

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Tipp City, Ohio

A. O. SMITH INTERNATIONAL, S.A.
Milwaukee 1, Wisconsin, U.S.A.

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STEEL is tension on the charging floor as molten iron begins to pour. It is a "heat" of 200 tons of fiery metal ladled into glowing ingot molds. From 41 Open Hearths of Youngstown comes the basic steel you need. High quality steel that is pierced, rolled, pressed and formed into tubular goods, sheet, bar, rod, tinplate and alloy steels. Steel for cars, for toys. For tractors, for pipelines. Steel from the expanding and integrated organization that marks Youngstown today as the growing force in steel.

SERVICE

YOUNGSTOWN is steel plus service. It is Orange Band pipe plus the largest engineering staff in the oil patch to help you use it. It is well casing complete with string charts. It is on time delivery. It is 16 distributors and our giant oil field supply division, Continental Emsco. It is physical quality that only the eyes of old hands in Youngstown mills can measure. Chemical quality that expert metallurgists provide. Youngstown service is another user benefit you'd expect from the growing force in steel.

Youngstown – growing force in steel

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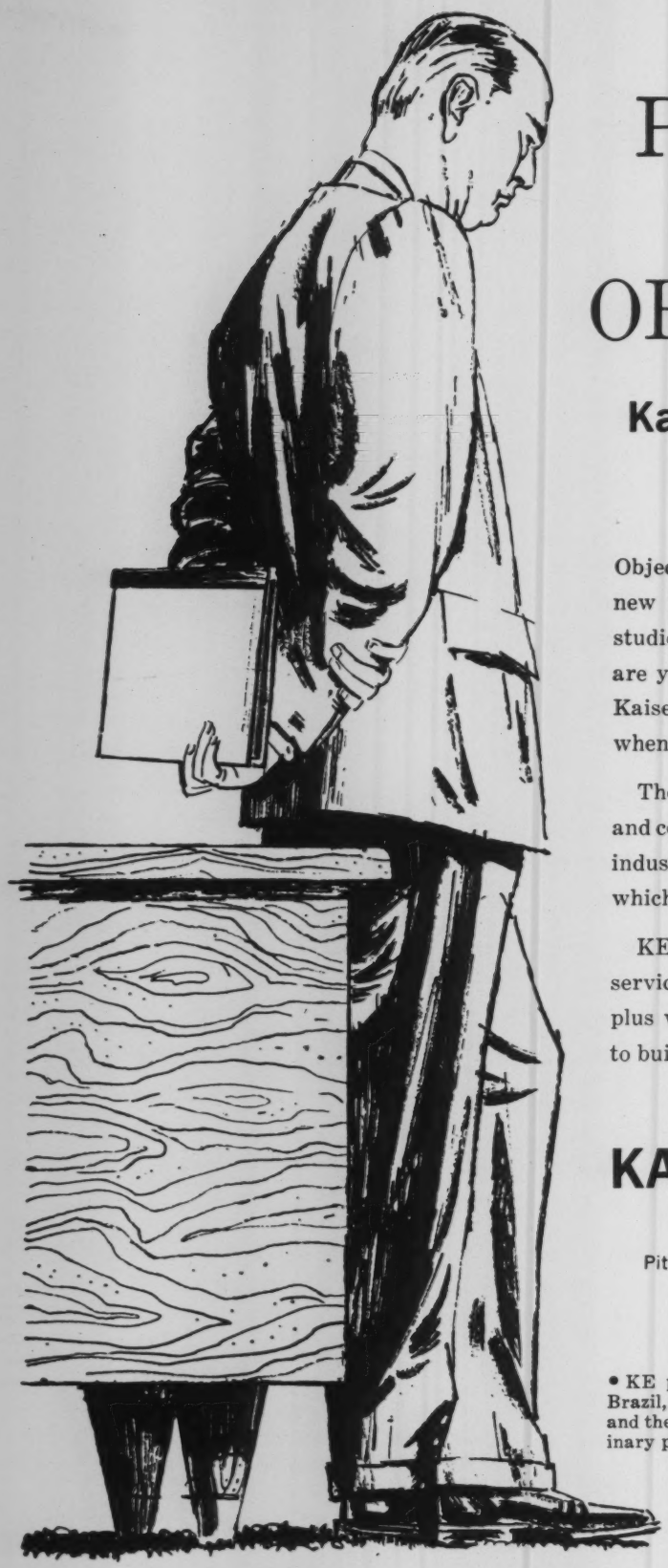

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Kaiser Engineers can help you decide

Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

These services are in addition to the design and construction of major facilities for the Steel industry—including the proven L-D Process for which KE is the U. S. licensor.

KE offers complete, one-company, integrated service from concept through construction—plus world-wide experience and the ingenuity to build quickly, within budget.

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• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

8458-S

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Tool Grinders

Reciprocating tool grinders are illustrated and described in a folder. One model is built for conventional grinding, and the other for the electrolytic process. Both grinders are double-end, dual-purpose machines for grinding cutting edges at one end, and chip-breaker grooves at the other. The folder also gives complete specifications and shows some accessories useful in sharpening tools. (Ex-Cell-O Corp.)

For free copy circle No. 21 on postcard

Welding Titanium

Titanium and its alloys is the subject matter of a 24-page booklet. It is intended to assist in the obtaining and use of titanium and titanium alloys. The booklet contains data on the latest approved methods of fabricating and welding titanium and its alloys. (Republic Steel Corp.)

For free copy circle No. 22 on postcard

Flexible Couplings

Covering a complete line of flexible couplings, a bulletin contains engineering data and applications concerning the couplings. The line includes couplings with flanges of zinc alloy, and the large size, bushed couplings fitted with interchangeable tapered bushings. (T. B. Woods Son's Co.)

For free copy circle No. 23 on postcard

Pallet Truck

Describing a 2000-lb capacity lightweight hydraulic pallet truck, a four-page, 2-color presentation contains illustrations, specifications and operating details. The pallet truck has exclusive operating features. (Lewis - Shepard Product, Inc.)

For free copy circle No. 24 on postcard

Fasteners

Making the offer of samples for users' own evaluation, an eight-page catalog gives complete specifications and application information on self-locking inserts and tapped holes. Cross-section application drawings make clear the features of each and its advantages in plastics, sheet metal and composition materials. Included in the catalog are easy-to-use charts detailing thread and hole sizes and grip lengths. Installation data is well illustrated. (The Boots Corp.)

For free copy circle No. 25 on postcard

Rust Preventive

Completely described on a product data sheet, a corrosion-preventive compound protects steel, tin plate, brass, aluminum, and other metals against corrosion for extended periods. (The Al-Con Chemical Co.)

For free copy circle No. 26 on postcard

Time Calculator

Use of a plating-time calculator readily determines the time required to obtain any desired thickness of plate at any current density. This is done by simply setting the plating thickness desired opposite the metal to be plated, and reading the plating time required opposite the current density to be used. The reverse side of the calculator tells the proper company metal stripper to use to strip a wide variety of plates from a number of different basis metals. (Enthone, Inc.)

For free copy circle No. 27 on postcard

Lubrication Systems

Containing information on a complete line of centralized systems of lubrication, a 24-page bulletin also covers new additions to the line. The advantages of centralized lubrication and the principles of

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FREE LITERATURE

operation are discussed, as well as system components. Also included are illustrations of typical applications. (Farval Div., Eaton Mfg. Co.)

For free copy circle No. 28 on postcard

Roughness Measurer

Packed with illustrations, a two-color bulletin describes practical features and applications of an instrument that measures surface roughness of machined or finished surfaces. The eight-page bulletin also depicts a variety of instrument combinations for measuring the surface finish of almost any production surface, and illustrates normal range of roughness readings. (Micrometrical Mfg. Co.)

For free copy circle No. 29 on postcard

Dowel Pins

A data sheet describes a dowel-pin assortment kit. The kit contains 10 each of 16 of the most often used dowel-pin sizes, specially priced. Sizes range from ½ in. length and ⅛ in. diam to 2 in. length and ½ in. diam. The kit puts a complete stock room right at the bench. (The Producto Machine Co.)

For free copy circle No. 30 on postcard

Grinding Spindles

A short bulletin, on precision grinding spindles, contains all specifications, photos and other details on the spindles. The spindles employ a new seal which completely seals bearings from dirt, abrasives, and coolants. (The Dumore Co.)

For free copy circle No. 31 on postcard

Industrial Grinding

Concisely detailed in an illustrated 16-page presentation are industrial-grinding facilities. Introducing the company's 50,000 sq ft plant, the folio presents 16 production grinders shown with finished parts produced on each. Some of the operations covered are continuous-feed dual-head blanchard, and internal and external operations. Capacity and tolerance ranges of each grinder are described. (Universal Grinding Corp.)

For free copy circle No. 32 on postcard

Flash-Butt Welders

Illustrating types of clamping, flash and upset mechanisms, a 16-page brochure describes the resistance flash-butt welding process. Designed for specific applications, forty butt-welders are shown and described, along with the welding job done. (The Taylor-Winfield Corp.)

For free copy circle No. 33 on postcard

Ultrasonic Cleaning

A bulletin describes a complete line of ultrasonic cleaners for standard applications and high-energy density applications. Full technical data is provided on eight different models. Also included is a description of service features. (National Ultrasonic Corp.)

For free copy circle No. 34 on postcard

Micro-Swivel

Consisting of four pages, a short bulletin illustrates and describes a mechanical micro-swivel for sensitive swivel-table adjustments on the company's line of cylindrical grinders. The swivel is a low-cost device for accurate swivel-table corrections. It is simple to operate and will produce more accurate work in a shorter time. (Landis Tool Co.)

For free copy circle No. 35 on postcard

Saw-Blade Hand-Book

Presenting guides for getting maximum cutting performance and blade life, a 36-page saw-blade handbook and catalog shows how to select the proper blade, correct feed, speed and tension. Common cutting problems and their solution are tabulated along with recommendations for cutting a wide variety of metals and non-metals. Tabulated for quick reference are sizes and types of blades in complete company blade line. (Ladish Co.)

For free copy circle No. 36 on postcard

Are You Getting What You Pay For?

When you pay for HIGH QUALITY high-carbon wire, you want to be sure you get it. You do, when it is supplied by Roebling.

It is unsurpassed in quality, consistently true to specifications, and absolutely uniform in gauge. Hundreds of manufacturers attest to this fact... the qualities that they *pay* for — they *get* in Roebling high-carbon wire. The length of our relationship with customers proves it.

We'll be glad to show you what we mean. For information on superior high-carbon wire or cold rolled strip, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

This lightweight "No Charge" spool is typical of Roebling's modern packaging methods that save customers time and money.

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Finishing operations not needed for cabinets made of Clad-Rex® Vinyl-Clad Metal

■ Out of the dies directly into assembly is the procedure in making finished television cabinets at Trav-Ler Radio Corporation, Chicago.

The reason—Clad-Rex vinyl-clad metals are *already* finished. Styling with color, texture and print is almost unlimited. No special tooling or complex production technique is required. The unusual abrasion resistance of Clad-Rex even affects the reject rate common to the relatively delicate coatings needed to finish bare metals.

See for yourself how *all* the other unusual advantages of Clad-Rex vinyl-clad metals can improve both your product and production operations. Write or call today. No obligation, of course.

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16 B

FREE LITERATURE

Photomicrography

Serving as a short course in photomicrography, a 46-page data book reviews the latest techniques in the photomicrography of metals. A reference guide for metallurgists, the booklet is illustrated with photographs, charts, and graphs. Written in layman's language, the booklet contains six major sections which include detailed information on the metallographic microscope, illumination, filters in metallography, photographic materials, exposure determination, and processing and printing. (Eastman Kodak Co.)

For free copy circle No. 37 on postcard, p. 105

Industrial Equipment

An eight-page brochure outlines a complete line of equipment including transfer machines, production units, programming machines, standard drills, honing machines, and coolant cleaning equipment. Illustrations include applications and parts, and data include machine capacities. (Barnes Drill Co.)

For free copy circle No. 38 on postcard, p. 105

Expanded Metal

Metal meshes of ductile materials, including precious metals, are described in a four-page folder. Its possible uses should prove valuable to those engaged in research and development work. Included as part of the folder is a chart listing minimum and maximum dimensions of the expanded metal. (North American Cement Corp.)

For free copy circle No. 39 on postcard, p. 105

Air Control

Printed in three colors, a 16-page brochure describes the latest company air-conditioning and drying systems. The equipment is used to stop condensation, speed drying and other processing operations, and to obtain sub-freezing dewpoints. The brochure also covers new climate-control rooms. (Surface Combustion Div. of Midland-Ross Corp.)

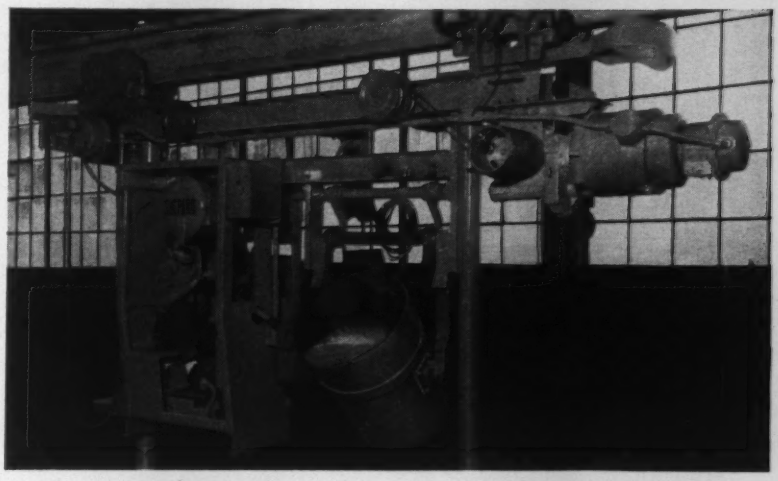
For free copy circle No. 40 on postcard, p. 105

SHEPARD NILES

HOT METAL CARRIER

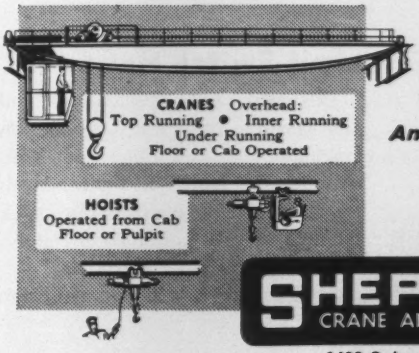
MOVE HOT METAL

the safe, swift, economical way



Shepard Niles hot metal carriers efficiently move molten metal safely and swiftly from cupola to pouring line. These rugged, modern carriers cut handling costs and save manpower by enabling ONE man to transport and pour molten metal. You can be certain of fast precision pouring because the operator cab is on the same level as the hot metal being poured.

Mechanize your foundry for labor-saving, low cost handling of molten metal. Send for the Hot Metal Carrier bulletin . . . or ask that a Shepard Niles representative call — there's NO OBLIGATION.



Building
America's Most Complete Line
of Cranes and Hoists
Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

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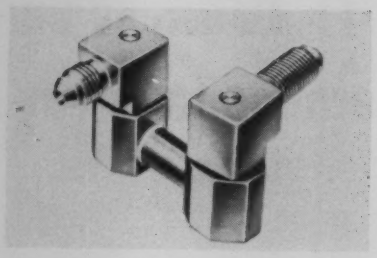
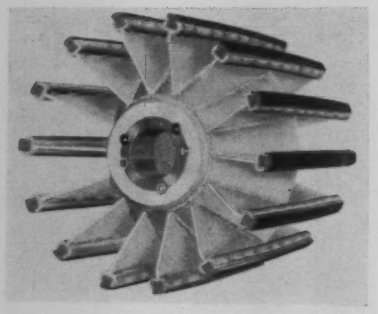
New Materials and Components



Connector Boasts Low Rotating-Torque Values

Made of stainless steel, and weighing but 9 oz, a compact twin-mounted swivel is bulkhead mounted. This mounting allows for misalignment of connecting lines. For missile, pneumatic or fluid uses, the ballbearing swivel connector features operation from 0 to 3000 psi, with proof at 4500 psi, and burst at 7500 psi. The temperature range is from —65° to +275°F. The connector is also available in many other materials. (Airaterra)

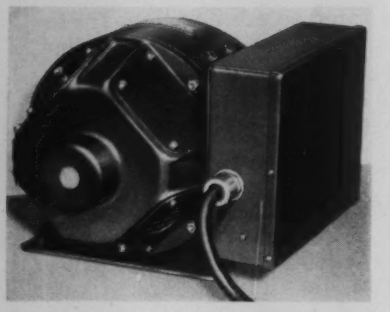
For more data circle No. 41 on postcard, p. 105



Rubber-Lagged Wing Pulley Gives Drive Position

Providing maintenance-free conveyor-belt operation, a wing pulley consists of wings with U-shaped steel channels which receive a steel-encased rubber bar. This high-tensile-strength rubber bar gives an excellent surface which will transmit maximum traction to the belt. The rubber bars grip the belt tightly and do a superior job of spalling off dried material on the underside of conveyor belts. When the arc of contact is broken, the rubber springs back to its normal height and automatically cleans itself. This eliminates pulley-cleaning shutdowns. (Van Gorp Mfg., Inc.)

For more data circle No. 42 on postcard, p. 105



AC-DC Motors Have Rectifier-Damage Protection

A line of integral horsepower ac-dc motors find ideal use as mobile field equipment, in remote areas where either ac or dc supply exists. The new line is available in ratings through 7-½ hp in 1800 and 1200 rpm speeds. The design involves the company's standard open ventilated motors packaged with four silicon rectifiers in a bridge circuit. The circuit does not require reconnecting for each type of current. Motor output is not identical for both types. Load requirements must be known so that they can be matched carefully with horsepower output. (Robbins & Myers, Inc.)

For more data circle No. 43 on postcard, p. 105

Limit-Switch Has Seal That Checks Seepage

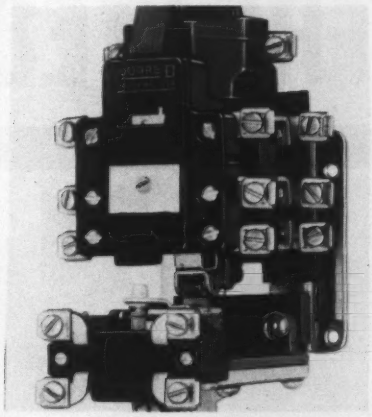
Designed for applications on high-speed, precision production machines, a new line of limit switches is truly oil-tight. Each switch is sealed to positively check seepage of oils, coolants, moisture, and abrasive grit. Parts and assemblies can be interchanged from switch to switch, or replaced without affecting subsequent accurate performance. Operating heads can be mounted in any of four positions, 90° apart. Rotary levers may be positioned anywhere through a 360° circle. The limit switches are ideal for installations where high impacts and adverse environmental conditions are major factors in failure. (Cutler-Hammer Inc.)

For more data circle No. 44 on postcard, p. 105

DESIGN DIGEST

Time-Delay Relays

A new device combines the functions of a machine-tool relay with a time-delay relay. The timer head provides either time delay after energization or time delay after

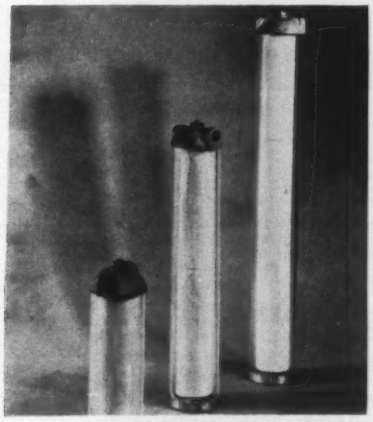


de-energization. It's convertible in the field from one to the other. Timing range is from 0.2 seconds to one minute, ±15 pct. (Square D Co.)

For more data circle No. 45 on postcard, p. 105

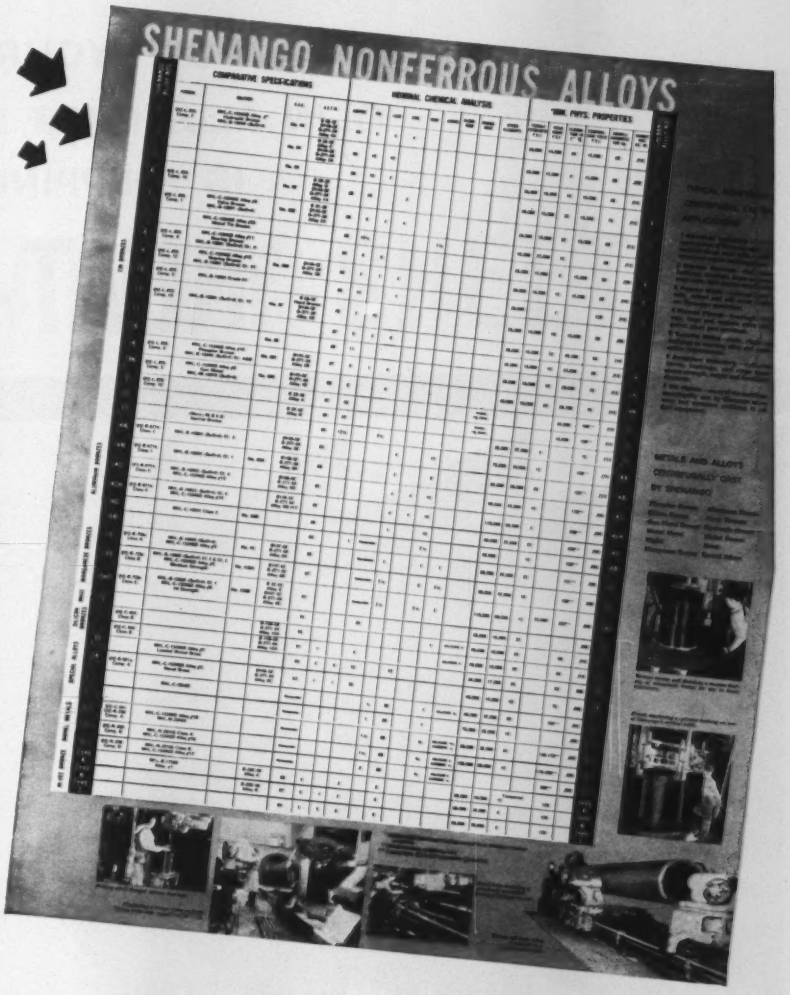
Water Filters

Cartridge-type water filters feature transparent acrylic barrels which enable visual inspection of the filtering action. Four models are available with flow ratings of 2.5



to 15 gpm. These filters are in-line types. Removal of one nut allows cartridge changes. Cartridges are available from stock in cellulose, cotton, glass fibers or felt. (Ion Exchange Products, Inc.)

For more data circle No. 46 on postcard, p. 105



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for ***COMPARATIVE SPECIFICATIONS***
CHEMICAL ANALYSES
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...clearly charted in SHENANGO'S new Bulletin No. 157

This invaluable chart of nonferrous alloys centrifugally cast by Shenango is readily available upon request. For your free copy, write to this publication or the Centrifugally Cast Products Division, The Shenango Furnace Company, Dover, Ohio.

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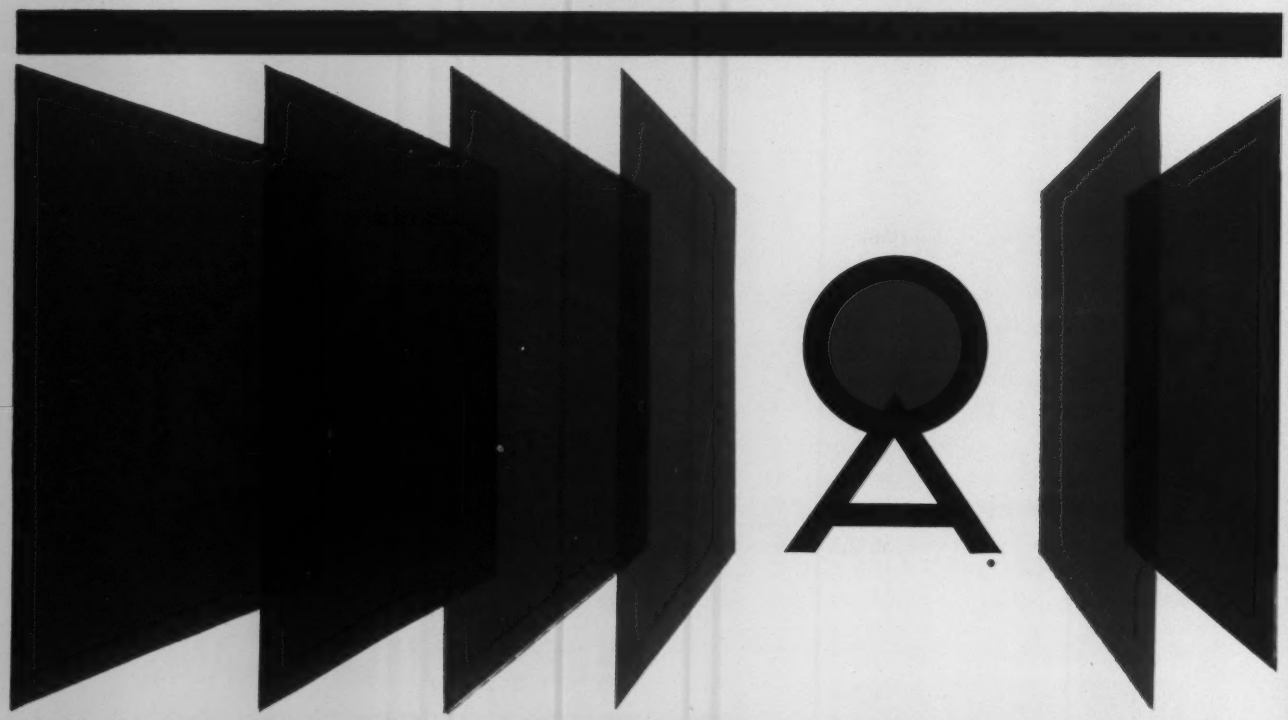

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WOrth 1-2147

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A. M. Castle & Co.
THornwall 5-2210

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A. M. Castle & Co.
LUdlow 9-6611

LOS ANGELES 22
Jones & Laughlin Steel Corp.
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SAN FRANCISCO 19
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ATwater 2-6920

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NAtional 5-6411

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CHICAGO 32
Lafayette Steel & Aluminum Corp.
LAfayette 3-7632

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A. M. Castle & Co.
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NEW ORLEANS 9
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TUlane 2471

MARYLAND
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Brass & Copper Supply Co., Inc.
BElmont 5-1500

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BOSTON 10
Kelco Metal Products Co.
HUbbard 2-1737

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PLeasant 3-7625

MICHIGAN
DETROIT 34
Production Steel Products, Inc.
TWinbrook 3-5000

MINNESOTA
MINNEAPOLIS 14
Keelor Steel, Inc.
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MISSOURI
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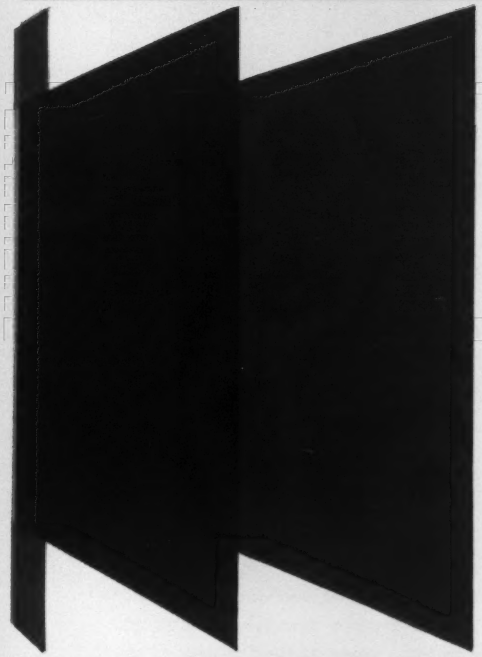
NEW JERSEY
NEW BRUNSWICK 1
Morrison Steel Co.
CHarter 7-8400

NEW YORK
BUFFALO 17
Seneca Steel Service, Inc.
RIverside 7920

STRONG ALLOY SHEET



In ultra-modern, heat-treating facilities, Olin Aluminum is making the metal that meets a nation's growing appetite for strong, tough aluminum alloys

Olin Aluminum has completed a major expansion of its sheet production capabilities. Result: your Olin Aluminum Distributor is now supplying heat treated and heat treatable alloys to meet Federal specifications for quality, analysis, temper and strength.

You can have off-the-shelf service on 6061, 2024 and 7075 sheet and plate – bare or alclad – in a wide range of tempers and finishes.

Ask your Olin Aluminum Distributor as well about common alloy sheets, about extrusions, or about Olin Aluminum cold-processed rod and bar – most machinable product of its kind yet developed.

More and more firms like yours are depending on their Olin Aluminum Distributor for all metals needs – ferrous and non-ferrous.

They're getting:

- **Quick, effective, custom-tailored service**
- **Extra plant space by limiting inventories**
- **Technical service backed by Olin Aluminum metallurgical facilities**
- **Slitting, shearing and roller-levelling service – in most cases**

Call your fast-moving Olin Aluminum Distributor and find out what service really means. Check the Yellow Pages under Olin Aluminum.

COIL, FLAT SHEET AND PLATE ... ROD AND BAR ... EXTRUDED SHAPES ... PIPE AND TUBING

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CLEVELAND 5
The Universal Steel Co.
VUlcan 3-4972

DAYTON 1
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CLearwater 3-6121
(rod, bar, extrusions)

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McCormick Steel Co.
MElrose 4-1492

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Lockhart Iron & Steel Co.
SPalding 1-3450

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CORPUS CHRISTI 1
McCormick Steel Co.
TUlip 4-0305

DALLAS 34
McCormick Steel Co.
CHapel 7-3104

HOUSTON 20
McCormick Steel Co.
ORchard 2-6671

LUBBOCK 1
McCormick Steel Co.
POrter 2-8793

WASHINGTON
SEATTLE 4
A. M. Castle & Co.
MAin 3-0565

WISCONSIN
MILWAUKEE 3
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MItchell 5-3400

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ADams 7-3585

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McGowan Co., Inc.
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OAKLAND 20
Globoloy Metals Inc.
HIghgate 4-7249

DELAWARE
WILMINGTON 99
North American Smelting Co.
OLympia 4-9901

ILLINOIS
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INterocean 8-9750

MASSACHUSETTS
MIDDLEBORO
Bay State Aluminum Co., Inc.
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HYacinth 7-3470-1-2

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SOUTHWESTERN U. S.
McCormick Steel Co.
(See listings under Mill Prod. Distr.)

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Trailer Coach Metal Specialties, Inc.
GIlbert 8-9801

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TRinity 5-3441

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Atlantic Steel Co.
TRinity 5-3441 (Atlanta)

ILLINOIS
CHICAGO 7
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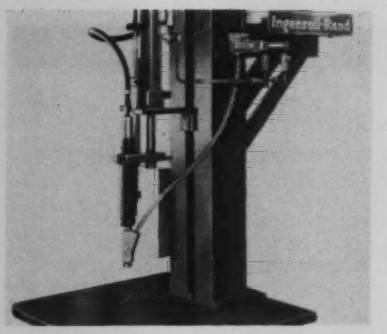
TAylor 9-0800

OLIN MATHIESON · METALS DIVISION · 400 PARK AVENUE, NEW YORK 22, N.Y.

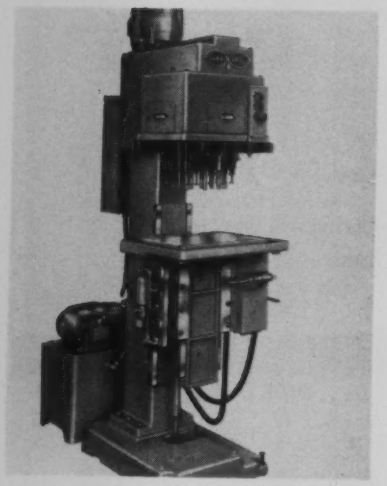
New Equipment and Machinery



Automatic Driver Permits Quick Changeover

By loosening and tightening only two bolts per powerhead, an automatic screw driver can change screw patterns. The unit drives practically any number of screws in almost any production pattern, to meet the demands of the fastest assembly lines. It runs screws in 1½ seconds. Three different air motors provide three different power ranges for precise predetermined torque control. Column height measures only 42⅜ in.; standard base measures 24 x 24 in.; throat depth ranges from 8-5/32 to 14 in. from center line of powerhead to column. Powerhead stroke is adjustable up to 6 in. maximum. (Ingersoll-Rand Co.)

For more data circle No. 47 on postcard, p. 105



Drilling and Tapping Machine Provides Economy

A multiple-spindle drilling and tapping machine, drills or taps up to 12 holes at the same time. This fully-automatic-cycle machine tool has a 2-hp, 1200-rpm, three-phase motor. At 60 sfpm and 1½-in. feed per minute, the drilling capacity is as follows: six-⅜-, ten-5/16-, or fourteen-¼-in. holes. At 75-pct thread, 20-ipm feed, the tapping capacity is five 5/16-18, eight ¼-20, twelve 10-32, and fourteen 8-32 taps. A 1½-hp motor drives the hydraulic pump which is bolted to the motor face for perfect alignment. The rated capacity of the pump is 700 psi. However, the pump is set at 360 psi, which activates a 3-in. double-end cylinder boosting the pump capacity 6.3 times. The ram is always engaged in slide throughout the table's full travel, thereby resulting in extreme rigidity. Some of the features of the drill include: maximum accessibility of controls, ease of setups, and profitable 250-piece runs. (Precision Tool & Mfg. Co.)

For more data circle No. 48 on postcard, p. 105

Hydraulic Presses Handle Heavy-Duty Jobs

Designed to handle a wide variety of press work demanded by industry, 25- and 40-ton electrically-powered hydraulic presses incorporate ease of operation and versatility, with built-in safety and simple maintenance. Frame members of these units are fabricated from selected structural steels for maximum rigidity and minimum deflection. The work tables provide a broad range of travel through the use of a self-locking, screw-geared winch. Both presses are equipped with a factory-set pressure by-pass valve to prevent any possibility of overloading or damaging the press. A cool-running motor and a radial piston pump provide the required hydraulic operating pressures. (American Chain & Cable Co., Inc.)

For more data circle No. 49 on postcard, p. 105

FLEXLITE RAISED HUB GRINDING WHEELS

Safety guard removed to illustrate full view of Flexlite Grinding Wheel

PEAK EFFICIENCY...PEAK STAMINA for high-speed portable grinding

From start to finish, U. S. Flexlite is the wheel that's built to reduce overhead. For smoothing and finishing welds, this is the most efficient, durable wheel in portable grinding. Comes in two types:

A24-H-BWD designed for use where fast rate of removal is the prime objective.

A24-Q-BWD designed for top efficiency and long life. Recommended for heavy-type applications such as heavy-gauge metals and heavy welds.

U.S. Flexlite Raised Hub Wheels are built for the utmost safety—their manufacture is controlled by unerring electronics. Layers of fiber glass reinforce the wheel. These wheels give you a cost-saving advantage right from the start.

• • •

Ask your "U. S." Distributor, or call or write U. S. Rubber, 10 Eagle St., Providence, R. I., or your local "U.S." District Office, or the address below.

Mechanical Goods Division

United States Rubber

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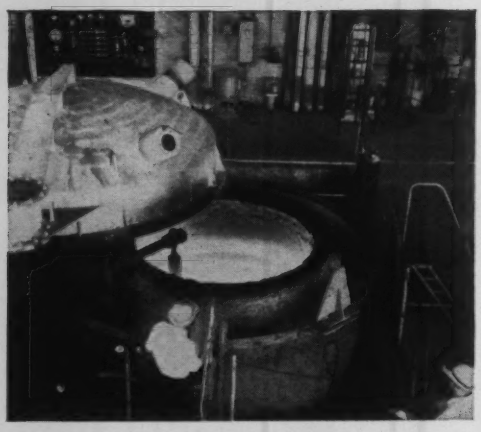
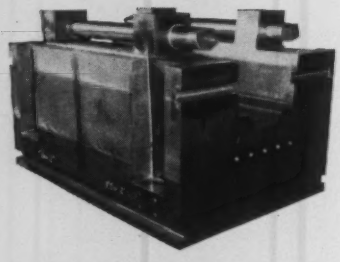


HOT WORK STEELS · DIE BLOCKS · FORGINGS · ELECTRIC FURNACE STEELS

FINKL *Vacuum Degassed* DIE BLOCKS and FORGINGS *give longer service life!*

Two 15,800 pound Finkl dies for precision aircraft forgings



36,000 pound die holder for use in titanium production, completely machined by Finkl

DIE BLOCKS made with Finkl vacuum degassed EF steels have greater ductility and toughness. This means that the chances of breakage under severe operating conditions is reduced. More production time is made available. With about 50% of the non-metallic inclusions removed from the steel, machineability is improved. Fewer tool regrinds are necessary. Higher lusters are obtainable in the impressions.

We supply 5 types of pre-hardened, ready-to-use die blocks, inserts and hot work tools in Special Machining Quality steel.

FORGINGS by Finkl are famous for their strength and resistance to withstand the severe stresses and strains imposed by modern heavy-duty machinery. Now available on request are Finkl vacuum degassed EF alloy steel forgings. The degassed steel adds even greater toughness and ductility to the forging, and the cleaner steel substantially increases tool life.

We also furnish forged parts of carbon steels in smooth forged, rough- or finished–machined condition.

FORGE REPAIR PARTS with the advantages of Finkl vacuum degassed EF alloy steels are also available on request.

A. Finkl & Sons Co.

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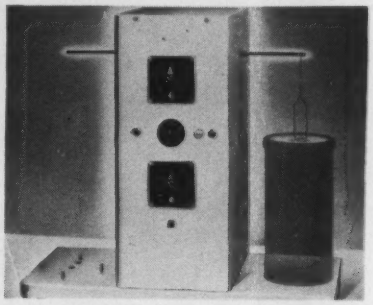
NEW EQUIPMENT

Vapor Determinator

Producers and users of coal products find it important to determine the amount of volatile material in coal and coke. The determinator for this analysis reproduces the manual operation in ASTM method D271-48, automatically. The apparatus provides advantages

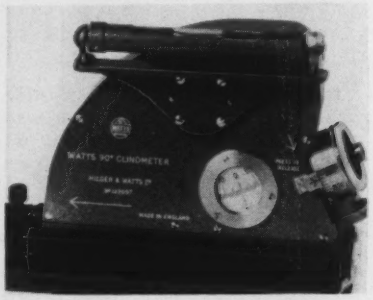


such as: exactly reproducible conditions by eliminating human variables, elimination of a stop watch, frees the operator for other duties during heating time, innumerable heating rates, and allows two analyses at a time. (Laboratory Equipment Corp.)

For more data circle No. 50 on postcard, p. 105

90° Clinometer

Now available in modified form for special leveling and tilt-testing requirements, a 90° clinometer features a control bubble of increased length and sensitivity—20-second sensitivity as standard. Since bubble mount can be set to



any desired angle with reference to the instrument's scale, the unit can be used to set up, adjust and control tilt tables, platforms, test fixtures, or indexing and leveling devices. The micrometer knob shows graduations in red and black for

style is stainless steel

Stainless Steel is the only surfacing material with a hard lustrous finish that is always in style, withstands exposure to all kinds of wear and has a low maintenance cost for the life of the building.

No other metal offers the freedom of design and fabrication, economy of care and the durable beauty that serves and sells like Stainless Steel.

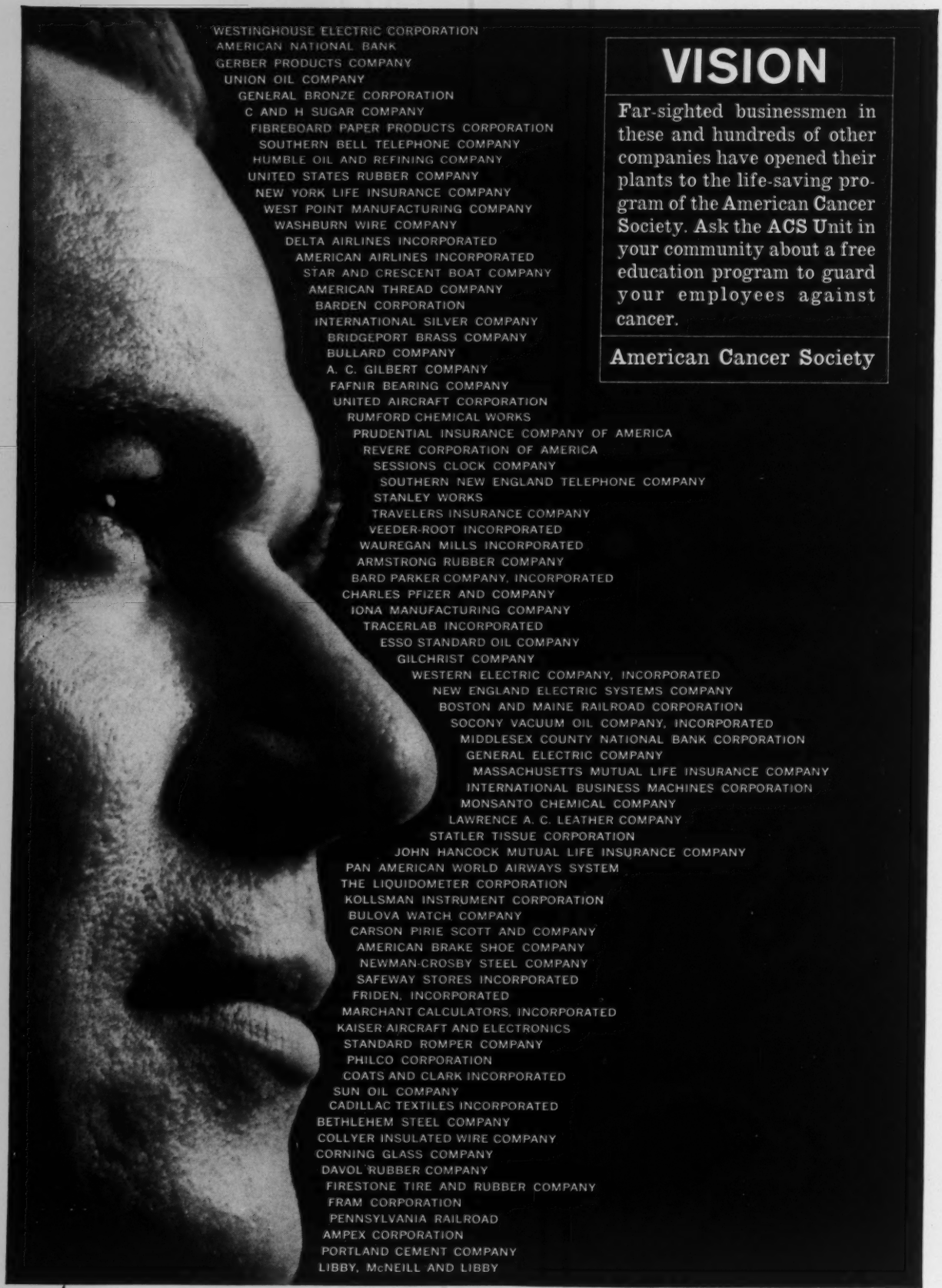
McLOUTH STEEL CORPORATION, Detroit 17, Michigan

specify

McLOUTH STAINLESS STEEL

HIGH QUALITY SHEET AND STRIP

for architecture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C AND H SUGAR COMPANY
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NEW ENGLAND ELECTRIC SYSTEMS COMPANY
BOSTON AND MAINE RAILROAD CORPORATION
SOCONY VACUUM OIL COMPANY, INCORPORATED
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SUN OIL COMPANY
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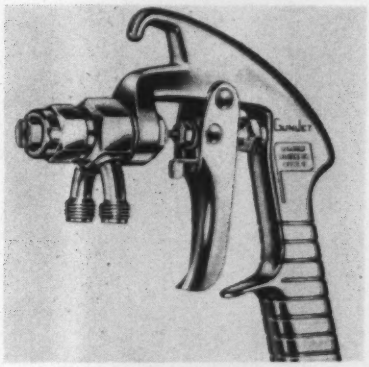
VISION
Far-sighted businessmen in these and hundreds of other companies have opened their plants to the life-saving program of the American Cancer Society. Ask the ACS Unit in your community about a free education program to guard your employees against cancer.
American Cancer Society

a clockwise and counter-clockwise direct-angle reading. (Engis Equipment Co.)

For more data circle No. 51 on postcard, p. 105

Airless Spray Gun

A new airless, paint spray gun permits continuous recirculation of liquid to maintain desired viscosity. The unit is built with a high-volume inlet and outlet, so that liquids can keep moving through the system during both use and shut-off periods. Design includes

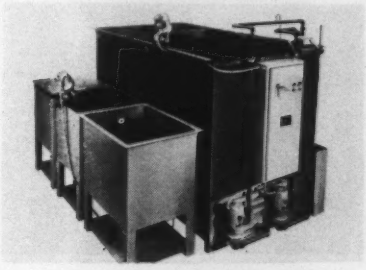


abrasion-resistant tungsten carbide valve seat and needle, stainless-steel body and cap, and Teflon packings. The valve seat is directly behind the orifice tip. Valve needle, in passing through the valve seat, automatically cleans the valve. (Spraying Systems Co.)

For more data circle No. 52 on postcard, p. 105

Chrome-Waste Disposal

Destroying chromium wastes, a packaged waste-disposal unit includes all the necessary tanks, pumps, mixers, and controls to ef-



fectively treat up to 600 gal of chromium waste per hour. The unit collects chromium rinse water in a sump and then pumps this into an

LITHIUM: FLYWEIGHT HERCULES

10% or more lithium to magnesium and you've got the highest strength-to-weight ratio of any known system.

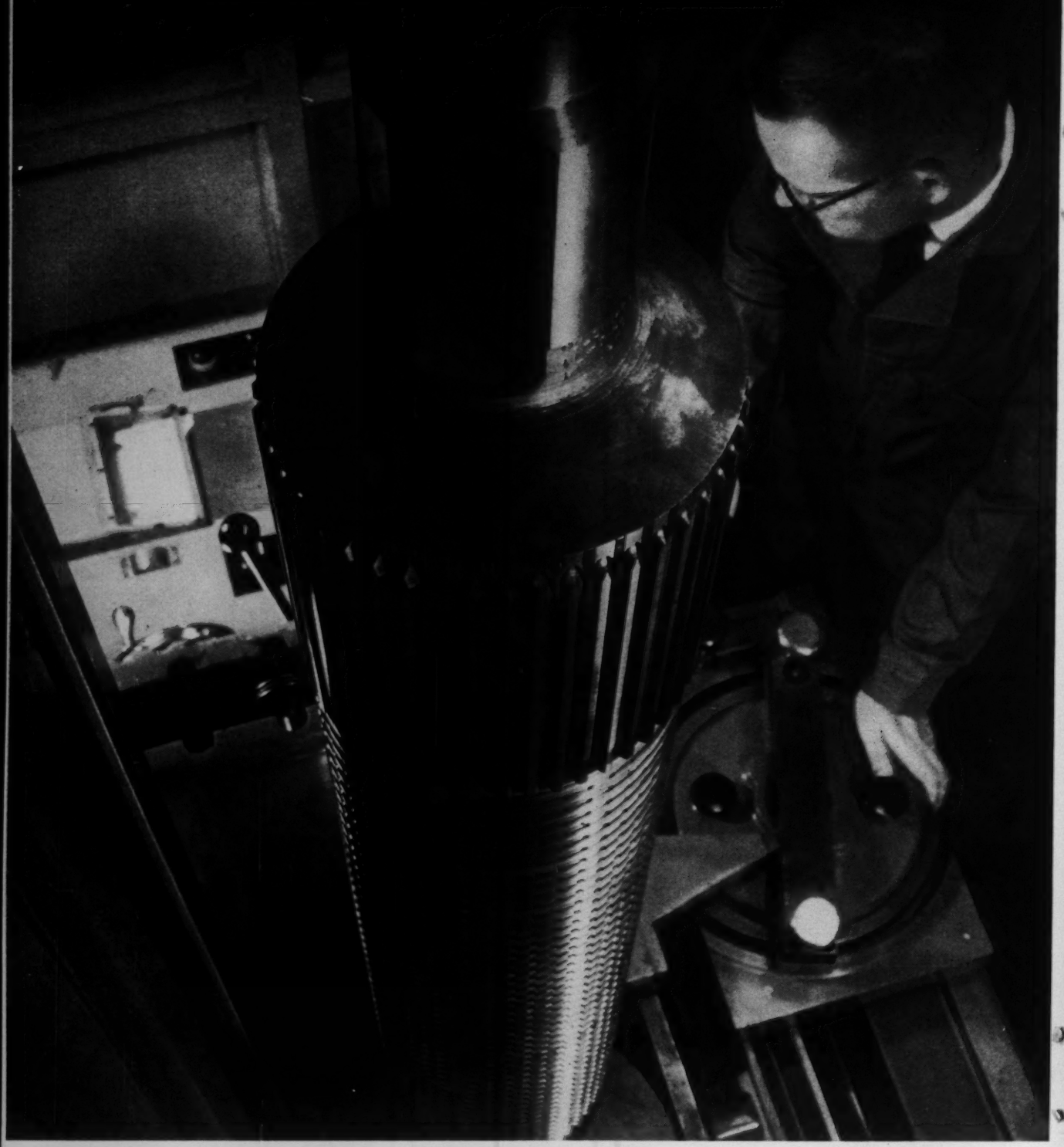
Add about 1% of lithium to aluminum and you get a new alloy that's 3% lighter, has an 8% higher modulus of expansion, and retains structural strength at 30% higher temperatures than conventional aluminum alloys.

Or you can add minute quantities of lithium, the lightest metal, to lead, one of the heaviest, for a tougher, lighter, harder, stronger alloy with improved founding qualities.

What would happen if you added lithium to your favorite metal? This kind of curiosity has led researchers to publish some three hundred references discussing the resulting alloys with just about every non-ferrous metal mentioned in the periodic table, from arsenic to old zinc.

The references have recently been compiled by Foote, and this definitive bibliography is available to you on request. Write **FOOTE** Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pa.

FROM CREATIVE CRUCIBLE: HIGH SPEED STEELS THAT MAKE BETTER TOOLS POSSIBLE



CHECKING THE INVOLUTE PROFILE OF A SPLINE BROACH. Broach's 6" pitch diameter is designed to cut 48 splines—hold accuracy of +.0002"-.000" on all splines for 30". This accuracy is possible on broaches up to 82" when made of Rex High Speed Steel.

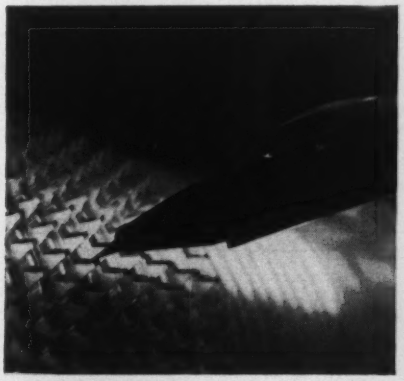
NOW, BROACHES PRODUCE MORE PIECES FASTER

They're also producing pieces with finer finishes and greater accuracy – because they're made of continually-improved Rex® High Speed Steels.

New broach designs and new broaching machines now enable you to mass-produce complex shapes in a matter of minutes. Furthermore, every piece is finely finished to within micro-inch tolerances.

What is behind this development? It's the increased skill of the broach tool makers, combined with Crucible's progress in making better high speed steels.

To produce the fine steels needed for broaches, Crucible tool steel specialists make use of the most advanced electronic instrumentation available today. For example: they use precision instruments to control the temperature of the molten metal in the melting furnace. So, each heat is produced under identical conditions.



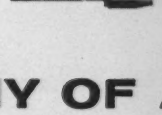
CHECKING THE TOOTH SPACING OF HELICAL INVOLUTE SPLINE. Finishing teeth on broaches made of Rex High Speed Steels reproduce shapes within tolerances of a few ten-thousandths of an inch.

Crucible tool steel specialists employ new techniques that greatly improve deoxidation of the liquid steel. They also use new ingot mold designs that provide freedom from segregation when the steel solidifies. And they ultrasonically inspect every billet of Rex High Speed Steel before rolling or forging.

Today Rex High Speed Steels continue to make the best broaches because they offer *1.* more uniform distribution of carbides throughout the section. This ensures minimum size change, greater predictability in heat treatment, greater hardenability and more uniform hardness in the heat-treated tool. And *2.* more uniform distribution of sulfides in the free-machining grades—which provides improved machinability and superior surface finish.

To make precision tools better with Crucible's Rex High Speed Steels, call or write the nearest Crucible branch office or warehouse.

BETTER TOOLS, THROUGH BETTER STEELS. The constant improvement of Rex High Speed Steels ensures the increasingly better performance of hobs, taps, twist drills and cutters—as well as broaches.



CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Caldwell, N. J. • Charlotte Chicago • Cincinnati • Cleveland • Columbus • Dallas • Dayton • Denver • Detroit • Erie, Pa. • Grand Rapids • Houston • Indianapolis • Los Angeles Miami • Milwaukee • Minneapolis • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City San Francisco • Seattle • Springfield, Mass. • St. Louis • E. Syracuse • Tampa • Toledo • Tulsa

eight-compartment mixing, reaction, and settling tank. Here, sodium metabisulphate, sulphuric acid and caustic are automatically metered into the waste. All meters, pumps, and controls are prewired, ready for operation on 220/440, 3-phase power. Operation of the unit is fully automatic and continuous. Wastes treated can be safely dumped directly into municipal sewer systems or streams. (George L. Nankervis Co.)

For more data circle No. 53 on postcard, p. 105

Protector Tubes

Protector tubes, made of Teflon, prevent erosion and dew-point corrosion at the tube-sheet opening of heat exchangers and condensers. Tapered at the end to reduce turbulence, the tubes are easily installed by means of a hand-press fit. They are inert to all chemicals and acids except molten alkali metals and fluorine at elevated temperatures and pressures. The tubes can withstand temperatures from —100° to +500°F. They are non-aging and non-flammable. (Resistoflex Corp.)

For more data circle No. 54 on postcard, p. 105

Air-Pollution Control

Operating on the principle of interphase reaction, a new air-pollution control device achieves high intimate contact. This is accom-

Now Truly HIGH SPEED BALANCING with the RAVA Type S

Pinpoint and remove unbalance in GYROS, ARMATURES and other rotors more accurately and in less time . . . Production rates up to 80 or more parts per hour . . . Speeds to 12,000 rpm—using peripheral belt drive, air or a magnetic rotating field. Unmatched speed and versatility.

TINIUS OLSEN
Testing Machine Co.
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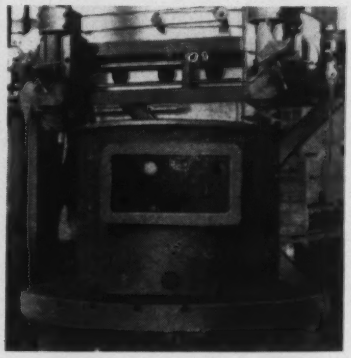
KUTZTOWN Skill

creates 78" LIQUOR BELT

By the time you read this, the Liquor Belt shown here will be hard at work in a corn processing plant.

When this photograph was taken, the 86" O.D. main flange of this Liquor Belt was being turned and faced on a 12' Vertical Boring Mill. The other flanges and bosses were also faced and drilled.

This Liquor Belt was loam molded in our foundry. It was cast of Class 30 iron. We have also cast liquor belts with nickel alloyed irons where additional wearing properties were required.



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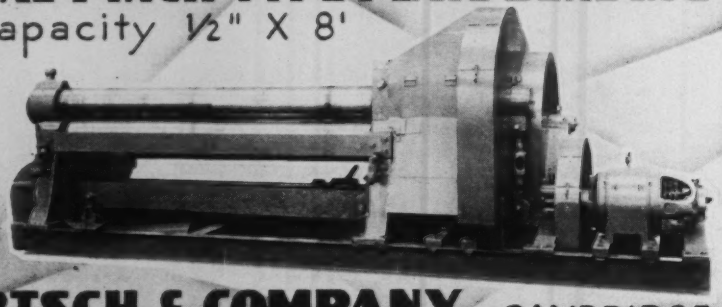
KUTZTOWN 35, PENNSYLVANIA

INITIAL PINCH TYPE PLATE BENDING ROLL
Capacity ½" X 8'



Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work.

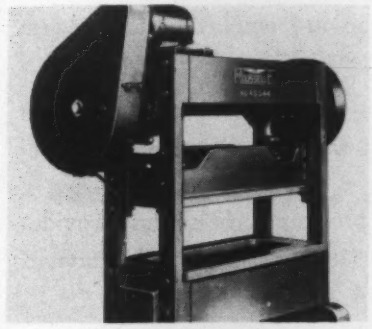
BERTSCH & COMPANY, CAMBRIDGE CITY • INDIANA

plished through a wet-bed packing only a few inches deep and maintained in a flooded condition. The device is capable of removing fumes from hydrochloric, sulphuric, nitric, and hydrofluoric acids; complex nitrogen oxides, alcohol, acetone, sulphur compounds, and fine dusts. (John Wood Co.)

For more data circle No. 55 on postcard, p. 105

Double-Crank Presses

Ideally suited for handling wide rolls or sheets of stock, including plastics and sheet metal, a 40-ton press has four long ways that provide a rigid four-corner ram support. This support makes it adapt-

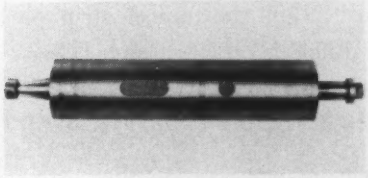


able for steel-rule dies and a variety of multiple punching. The unit is available in three sizes with bed areas up to 6 ft. Standard die space is 12 in., but can be increased up to 24 in. (Service Machine Co.)

For more data circle No. 56 on postcard, p. 105

Roller-Bearing Spindle

Rated up to 2700 rpm, a heavy-duty, tapered, roller-bearing spindle gives the same accuracy as other company spindles. This is achieved by carefully preloading the tapered roller bearings. The use of four



tapered roller bearings permits the spindle to take high radial and thrust loads. Therefore it can be used on applications such as crush grinding, roll grinding, and vertical spindle grinding. (The DoALL Co.)

For more data circle No. 57 on postcard, p. 105

Reduce assembly costs and time with...

MACWHYTE

CABLE

ASSEMBLIES

You'll save production time and costs by using precision-made Macwhyte "Safe-Lock" cable assemblies on your equipment. Each assembly is positively uniform, with trim, good-looking fittings that develop the full strength of the wire rope.

You'll reduce costs by eliminating "hand-made" assembly operations. The units arrive ready for safe, easy, quick installation — fit "right" every time — are so uniformly made that you can give them a standard parts number.

Assemblies are made to your specification, or we'll design them for you. Available in bright steel, galvanized, stainless steel, monel metal, or plastic-coated wire rope.

Catalog 5601 is a handy, helpful guide in designing, selecting, and ordering cable assemblies. Send for your free copy to Macwhyte Wire Rope Company, Kenosha, Wisconsin, U. S. A.

193

MACWHYTE Wire Rope COMPANY

in only 90 days...

101 aluminum fabricators have ...Amchem's newest

ALODINE 1200S protects aluminum best ...at less cost, in less time!

To the hundreds of long-time users of Amchem Alodine—the first, low cost effective surface conversion treatment for aluminum—add a new host of fabricators who are employing the newest Alodine development—ALODINE 1200S!

If you are producing aluminum—any type of aluminum—you'll want to investigate the production advantages and profit potentialities of this new Alodine pre-paint process that provides constant, uniform quality as well as big savings in time, equipment and processing costs!

Through increased chemical activity ALODINE 1200S slashes processing time *up to 50 percent!* A 1200S system can be installed on your production line quickly and conveniently . . . and bath is maintained chemically . . . no special equipment required to control contamination! In an ALODINE 1200S system, products can be processed through continuous dip in the same time cycle other conversion coatings require for continuous spray lines! That means lower initial equipment and maintenance costs, wider range of product applications regardless of the application method—brush, dip, continuous strip or spray. ALODINE 1200S is qualified under Government Specification MIL-C-5541.

ALODINE 1200S is Amchem's positive answer to constant uniform quality in aluminum processing. Put its assured protection and production flexibility to work for your aluminum products and market them with greater confidence!

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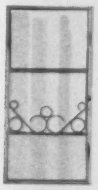
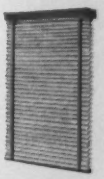

aluminum doors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IN CORROSION RESISTANCE AND PAINT BONDING QUALITIES TO THESE AND

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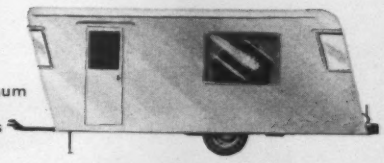
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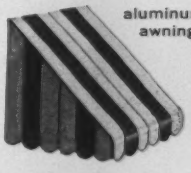
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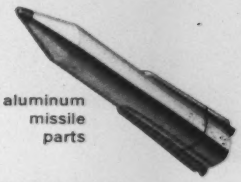
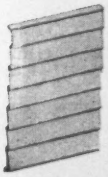
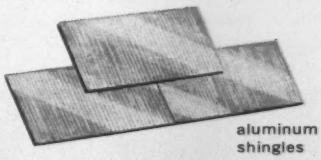
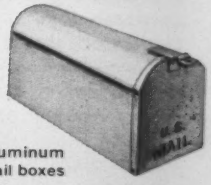

aluminum missile parts

UPGRADE YOUR PRODUCTS' CONSUMER APPEAL WITH ALODINE PROTECTION.


aluminum siding


aluminum shingles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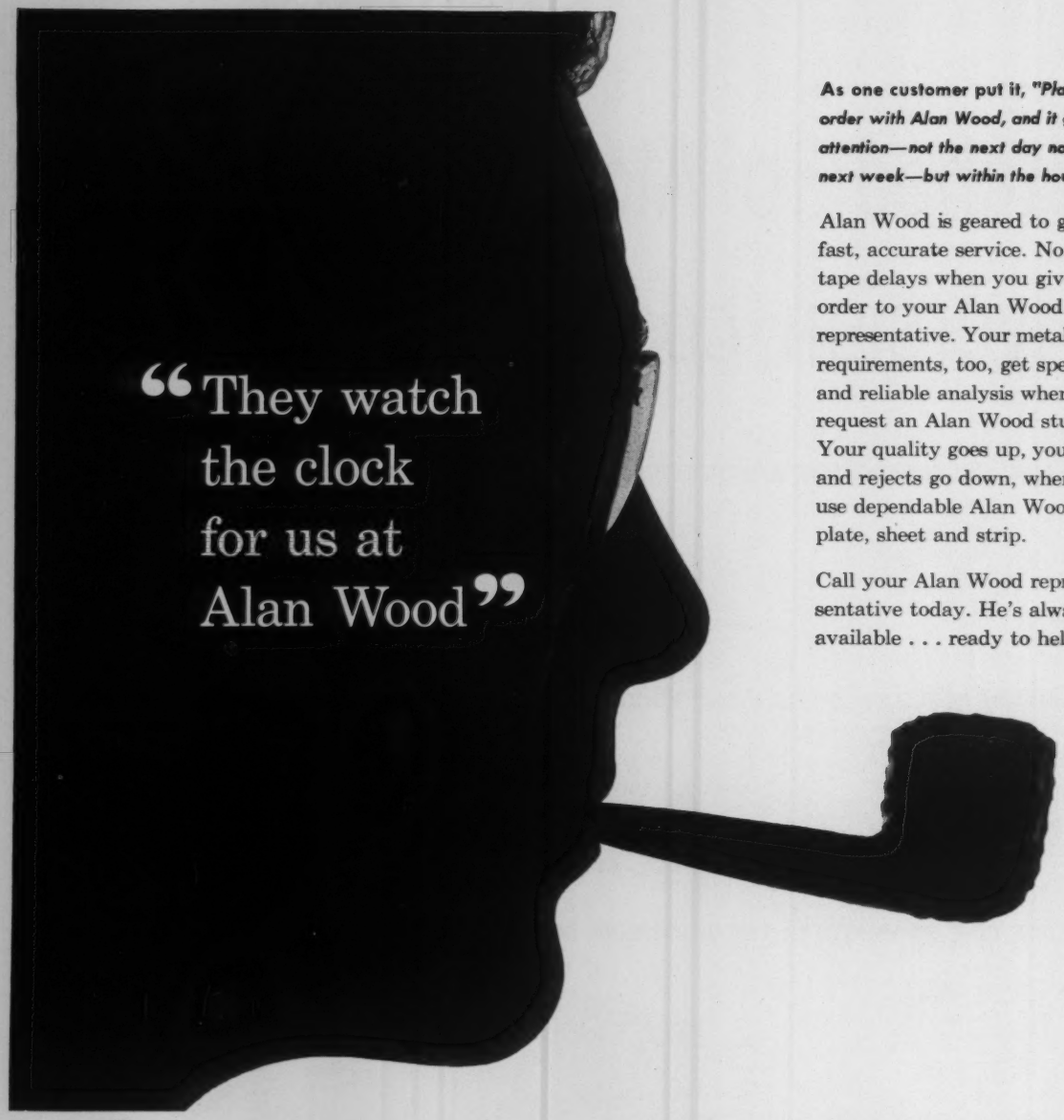

As one customer put it, *"Place an order with Alan Wood, and it gets attention—not the next day nor the next week—but within the hour!"*

Alan Wood is geared to give you fast, accurate service. No red tape delays when you give an order to your Alan Wood representative. Your metallurgical requirements, too, get speedy and reliable analysis when you request an Alan Wood study. Your quality goes up, your costs and rejects go down, when you use dependable Alan Wood plate, sheet and strip.

Call your Alan Wood representative today. He's always available . . . ready to help.

ALAN WOOD STEEL COMPANY

Conshohocken, Pa. • **STEEL PRODUCERS WITH THE CUSTOMER IN MIND**

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The Iron Age Summary

Price Boosts Not Yet in Sight

Eventually, steel prices will go up—probably near the end of this year.

But there is little immediate pressure for increases and lots of pressure to hold the line.

■ An across-the-board increase in steel prices is not imminent. No general price action is likely until the end of 1960.

And then, there is no more than a 50-50 chance of an increase averaging from $3.00 to $4.00 a ton.

Market Missed — The current surge of price talk was touched off by statements on the steel strike effects that were included in company annual reports.

But based on market conditions, which indicate a severe softening in late spring and summer, the steel companies have missed their market for any post-strike price increase.

The Reasons—The IRON AGE lists these reasons why a steel price increase is not likely in the near future:

Imported steel is still a serious threat.

Other materials and building and fabricating techniques are closing in on steel's price advantage in several markets.

Not all steel producers are convinced prices must go up. This raises the possibility that any company increasing its prices might have to backtrack.

Also, the possibility of steel prices going up in a Presidential election year is unlikely, regardless of the party in power.

Long-Range Factors—There are also long-term pressures that have a bearing on price stability. This year alone, steel companies will spend $1.7 billion for new plant and equipment for the principal purpose of defeating higher labor costs.

In addition, steel companies have quietly started a tremendous drive to upgrade and improve their raw material picture in every way possible.

Market Eases—While steelmakers ponder price questions, the market continues to soften. Order volume is off and some cancellations continue to crop up. The March dropoff is running against seasonal trends in that the month usually brings an upturn in production and shipments.

But putting the market in proper perspective, these points should be considered:

First quarter production will be 35 million ingot tons. This is an annual rate of 140 million tons and not even the wildest predictions went that high. An easing was inevitable.

Books Fill Slowly—There is still a lot of steel on order. April schedules are full for the most part, on cold-rolled sheet, galvanized, and tinplate. Wide flange beams will also show a good April.

Automakers appear to have caught up on inventories, with stockpiles of steel around the 30-day level. Orders for April still aren't all in, however. May orders are filtering in, but at a disappointing pace. May orders for automotive steel, which will be used in July production, may be 40 to 60 pct below June.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,554	2,608	2,690	2,631
Ingot Index				
(1947-1949=100)	159.0	162.3	167.5	163.8
Operating Rates				
North East Coast	86.0	87.0	92.0	98.0
Buffalo	98.0	103.0*	100.0	99.0
Pittsburgh	90.0	94.0	96.0	97.0
Youngstown	79.0	86.0*	89.0	87.0
Cleveland	102.0	100.0*	102.0	96.0
Detroit	99.0	100.0*	102.0	96.0
Chicago	95.0	96.0	98.0	92.0
Cincinnati	100.0	98.0	101.0	86.0
St. Louis	99.0	86.0*	103.0	101.0
South	85.0	87.0*	88.0	94.0
West	78.0	80.0	90.0	87.0
U. S. Rate	89.6	91.5	94.4	92.9

*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$33.33	$33.50	$37.17	$40.50
No. 2 bundles	$22.67	$22.33	$23.50	$27.83
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.30
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.875	100.625	102.25	102.75
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Senate Hits Defense Buying

Defense Dept. buying and inventory controls systems are under attack by the Senate.

It wants better procedures adopted to cut out excessive dollar wastes.

■ Defense Department purchasing and inventory controls are under renewed attack in Congress.

Despite continued congressional directives to streamline business practices, the Pentagon has been reluctant to adopt common supply and service systems for the services, a new report prepared by the Senate-House Economic Committee charges.

Little Progress—Military service buying practices, particularly in so-called housekeeping items, have been under fire for years, but little has been accomplished, the report complains.

The report says that housekeeping supplies alone total 25,000 of the estimated 3.4 million items the military services buy. But only 3,600, or 14 pct, of these supplies are standardized for common use by two or more of the services.

Big Inventory — The military services have a two and a half year inventory of these supplies. These include furniture, food equipment, and office machines. In contrast, the government's civilian purchasing agency, the General Services Administration, turns its inventory of such items over three times a year, the report notes.

In spite of long years of pressure, the Committee under Sen. Douglas, D., Ill., complains, the only major result so far has been creation of four single manager plans—for food, clothing, medical supplies, and petroleum products.

Pilot Study — The Department recently completed a pilot study of the possibility of integrating service buying of hand tools. This is the first such study in six years. As a result, single manager plans were recently established for hand tools and housekeeping supplies, to be purchased and handled by the Army, and hardware, paint, and related items assigned to the Navy.

But the services could save an additional $450 million a year by completing the standardization of supply systems.

Common Use—The cost of inefficient practices in broad areas of common-use, technical-type supplies and equipment is much greater than in the minor areas, and still to be solved, the report says.

The Air Force is accused by the Committee of operating a greatly expanded program of local purchases at its bases to get around a law requiring it to get common-use supplies from the Army.

It also notes that some progress has been made in developing a standard stock catalog (saving $1 million for each 1,000 items eliminated due to standardization).

Chicago Boom Losing Force

■ Purchasing agents in the Chicago area say that the first quarter business boom is losing momentum. Lower production was reported by 50 pct of the firms questioned in the monthly survey of the Business Survey Committee of the Purchasing Agents Assn. of Chicago.

	FEB. 29	JAN. 31	DEC. 31	NOV. 30	OCT. 31	SEPT. 30	FEB. 1959
VENDOR PERFORMANCE							
Deliveries Made by Vendors:							
Faster	40	21	12	13	5	8	12
Same	59	71	77	61	62	57	53
Slower	1	8	11	26	33	35	35
Prices Paid for the Principal Items You Buy:							
Higher	15	30	34	34	38	34	23
Same	84	70	66	65	61	66	75
Lower	1	0	0	1	1	0	2
Inventories of Principal Items You Buy for Production and Resale:							
Larger	39	37	33	25	18	17	40
Same	46	50	49	44	41	46	52
Smaller	15	13	18	31	41	37	8
Production:							
Higher	22	34	32	26	26	30	47
Same	51	52	46	54	50	56	47
Lower	27	14	22	20	24	14	6
Your Backlog of Orders for the Products Your Company Sells:							
Larger	17	23	34	32	25	29	42
Same	45	50	34	36	49	46	42
Smaller	38	27	32	32	26	25	16

• This Merchant Bar Mill, recently delivered to Ceco Steel Products Corporation at Lemont, Illinois, has many automatic features including escapement repeaters and mechanical turning devices enabling it to handle all bars mechanically.

The *14*-stand mill, designed to roll mild steel, includes a 4-stand in line roughing mill, a 4-stand intermediate continuous mill, a cross country mill and a continuous finishing mill. It rolls rounds, squares, deformed reinforcing bars, flats, angles and architectural window sash sections.

Designed by Birdsboro, in cooperation with Ceco Engineers, this mill is another example of our ability to give customized mill equipment assistance to steel producers. Your Birdsboro representative can tell you about other cases which may closely parallel your own. Call him in soon. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa.; *District Office:* Pittsburgh, Pa.

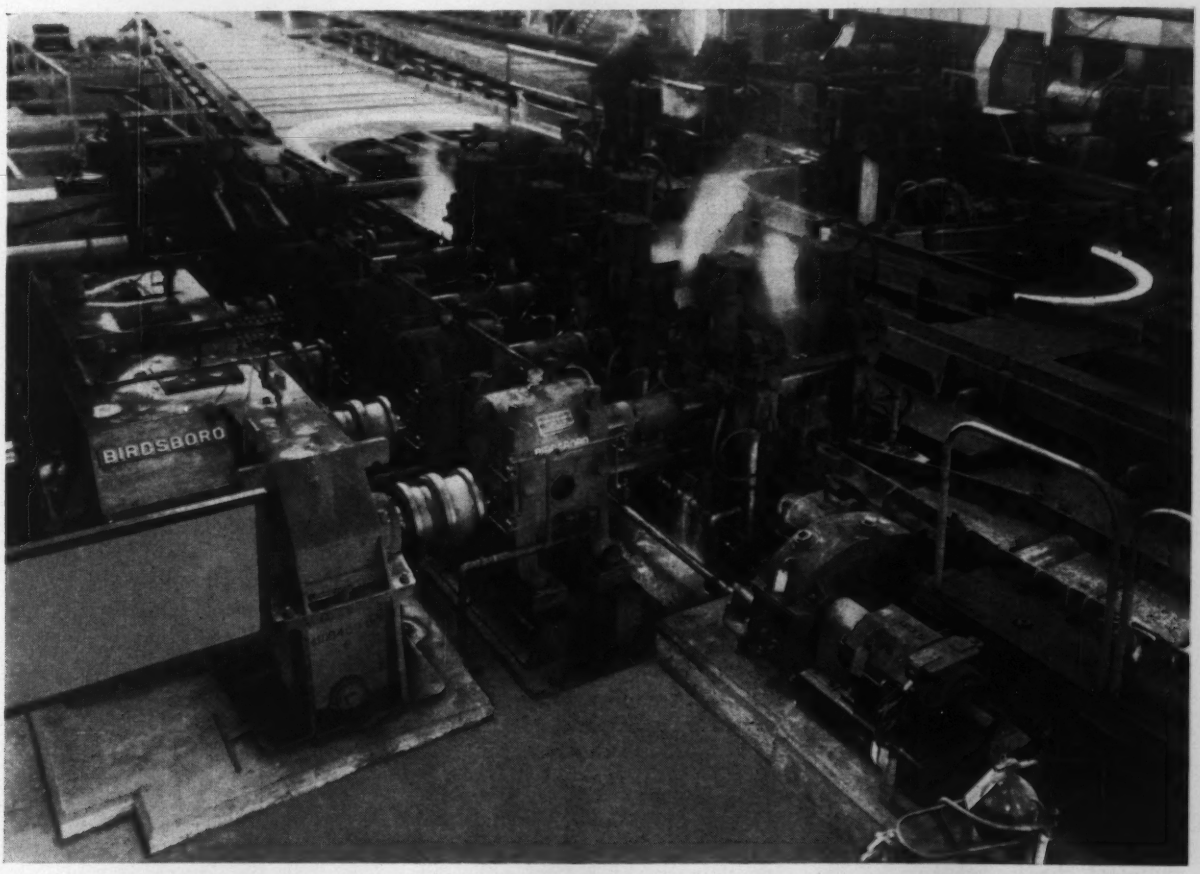
First mill designed exclusively

to direct roll electric steel

ingots of up to 1000#

into finished bars...

another **BIRDSBORO** *"first"*



MMS4-60

BIRDSBORO
CORPORATION

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel.

Users Climb Into Drivers Seat

Now that inventories have been rebuilt, steel users are making it apparent speed in delivery will get the business.

And they're shopping around before placing their orders.

■ Customers are serving notice that from now on business will go to the producer who can promise quickest delivery—and deliver on time.

The trend is a logical outgrowth of the inventory tightening that has set in. Business continues good, but at the same time steel users are drawing the line on inventories. In this situation, it's inevitable for holes to appear in inventories. And it follows that users want to fill them as quickly as possible.

Tough Demands—"Some buyers want to order steel in the morning and get shipment the same afternoon, or almost," complains one **East Coast** mill man. Another points out, "A week's delay draws strong questions. And if you miss out on the second promised shipping date—look out."

A third notes, "Customers are fussier about deliveries than they have been in a long time. On new orders, they are definitely shopping around, especially in plate."

Shopping Tactics — Large tonnage customers are still placing orders on a regular basis. And they represent the largest part of the business. But spot tonnage orders and orders from smaller users are keeping district sales offices on the move.

In the **Cleveland** area, it has become routine for plant purchasing agents to put out a list of steel items and the sizes needed. Whichever mill can offer best delivery gets the order.

With a little shopping, according to reports, purchasing agents can fill holes on most standard items in about three to four weeks. And only rarely does it take more than six weeks for special items.

Mills in the **Pittsburgh** area are getting set for a tough selling period. Cost controls are being tightened. And salesmen are getting the word to put more effort in selling. At the same time, mills are building up stocks of semifinished steel; this will permit faster deliveries.

Midwest Market—Delivery promises appear to be dropping rapidly in the **Chicago** district where pig iron, bar, wire, and some structural and plate are being offered for immediate delivery. Mills are calling in salesmen for pep-talks to boost May and June ordering. The Great Lakes shipping season will open shortly, adding another element of competition within the area. Despite some complaints about quality, there has been a pickup in the past week or so in orders for foreign steel.

PURCHASING AGENT'S CHECKLIST

More use of colored metals pushes development of better, more durable finishes. P. 47

Is materials research moving at too slow a pace? P. 51

Companies show interest in welded design for machine bases. P. 92

On another front, automakers appear to be stuck with commitments for premium steel. There are reports of large orders being placed with mills by brokers for resale to automakers at premium prices.

Sheet and Strip—The once seemingly insatiable appetite of the auto industry appears to be sated. Stockpiles are up to a normal 30 days or better. And some inventory cutting may be coming. An **East Coast** mill says its April orders were cutback to about 65 pct to 70 pct of normal auto account tonnage. And this mills believes it was cut less than others. A mill executive in **Pittsburgh** points out there is a fine line between an easy and tight market. Any new push from autos, he believes, would cause an immediate tightening. But right now it looks as though the market will continue to loosen. May orders for steel are only a trickle so far in **Detroit,** but cancellations seem to be levelling off. A rapid easing is noticeable in **Cleveland** where hot-rolled sheet is being offered for 30 day delivery. A few weeks ago, the best that could be promised was 45 to 60 days. Mills in the area which normally offer cold-rolled sheets only are also looking for hot-rolled business. Some will absorb freight in order to get the added business.

Pipe and Tubing—Pipe mills are just at the point where production must be brought into line with incoming orders, according to reports from **Pittsburgh.** One mill, for example, is getting orders for about half of its production rate. However, a seasonal improvement is due for standard pipe and it is showing signs of a mild pickup.

Stainless — Shipments have dropped below the level of a year ago at this time, but are better than the 1958 rate. Heavy shipments have rebuilt inventories, and in some cases created a surplus. Producers around **Pittsburgh** feel the market is abnormally depressed right now by inventory liquidation. They look for improvement when the inventory reaction ends.

COMPARISON OF PRICES

(Effective March 22, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Mar. 22 1960	Mar. 15 1960	Feb. 23 1960	Mar. 24 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10**	14.10**	14.10**	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Mar. 22 1960	Mar. 15 1960	Feb. 23 1960	Mar. 24 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$34.50	$38.50	$43.50
No. 1 steel, Phila. area	35.00*	35.50	37.50	37.50
No. 1 steel, Chicago	30.50	30.50	35.50	40.50
No. 1 bundles, Detroit	30.50	30.50	34.50	34.50
Low phos., Youngstown	37.50	37.50	43.50	44.50
No. 1 mach'y cast, Pittsburgh	52.50	52.50	55.50	50.50
No. 1 mach'y cast, Phila.	51.50	51.50	52.50	49.50
No. 1 mach'y cast, Chicago	52.50*	51.50	56.50	54.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$33.33*	$33.50	$37.17	$40.50
No. 2 bundles	22.67*	22.33	23.50	27.83
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	100.25	100.25	102.25	102.75
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.30
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Quiet Market Waits For New Trends

Right now the market is still drifting along, with activity very limited.

But sales trend in next few weeks should show if the bottom has been reached.

■ The market is drifting along quietly, waiting for clues on future movement.

With trading limited, prices are generally unchanged. Dealers are fairly sure the bottom has been reached. They look for more activity next month. But there's little confidence prices will make strong gains upward.

Industrial and auto lists due next week should furnish clues on the market's strength. But a drop is expected in April tonnages.

Reluctant Mills — Meanwhile, mill buying is still extremely limited. Foundry and electric furnaces are showing little strength. Export is buoying up prices of steelmaking grades in coastal areas.

At inland points, poor weather and lack of interest has dried up scrap yard intake. The lower prices are not encouraging collections.

January Slump—The downturn in scrap buying shows up clearly in latest reports from the Institute of Scrap Iron & Steel. During January, use of purchased scrap is estimated at 2.7 million gross tons, down from the 3 million gross tons in December.

However, total use of purchased and home scrap set a new record in January of 7 million gross tons. And consumer inventories of scrap declined 420,000 tons, the largest drop since January-February of 1951.

Pittsburgh — Prices of most grades are unchanged as the market continues to drift. New auto and industrial lists due next week may set the direction of the market. They should show whether the floor has been reached or further weakness is likely. Right now, shipments of No. 2 bundles are moving slowly on old orders. Yard collections are off. One dealer estimates flow of scrap into yards is 25 pct of normal.

Chicago — Some mill sales at stronger prices revived optimism in this market. But tonnages purchased were small. In general, the price lists shows no marked upward movement. Some grades are still declining slightly. A few foundries may strengthen buying plans at present price levels.

Philadelphia — Export still provides most of the life in the market. Three or four boats are expected in the next few weeks. Only a very limited amount of domestic buying is going on. A $2 spread exists in No. 1 and No. 2 heavy melting. Material delivered to the docks for export commands the higher prices. But mills inland are able to buy at the lower level.

New York—There is no change in conditions or attitudes in this market. Some dealers are pessimistic unless April shows a pickup. With little or no domestic business, export is holding the price up.

Detroit — Dealers are a little more optimistic, despite a lack of mill buying. Some think the market low has been reached, at least for a while. At present, they are marking time, watching for signs which will show the way the market will move in April.

Cleveland—The market is coasting on previous orders with no change in sight. Brokers are reaching into fringe areas to cover old orders. Secondary scrap sources, such as auto wreckers and sheet iron suppliers, are drying up because of low prices.

St. Louis — Market is quiet. Snow storms have hampered scrap gathering and delivery to users. Prices seem to have leveled off. Supplies still exceed demand, but prices are not expected to decline much further. However, dealers are not optimistic about an upturn. Starting this week foundry steel, 2 ft will be carried among St. Louis prices. Prices on angle and splice bars have been dropped.

Cincinnati—Some signs of market stiffening are showing up. Dealers are not eager to sell at present prices. A livelier market is expected next month. At that time, some hot metal capacity in the area will go down for overhaul.

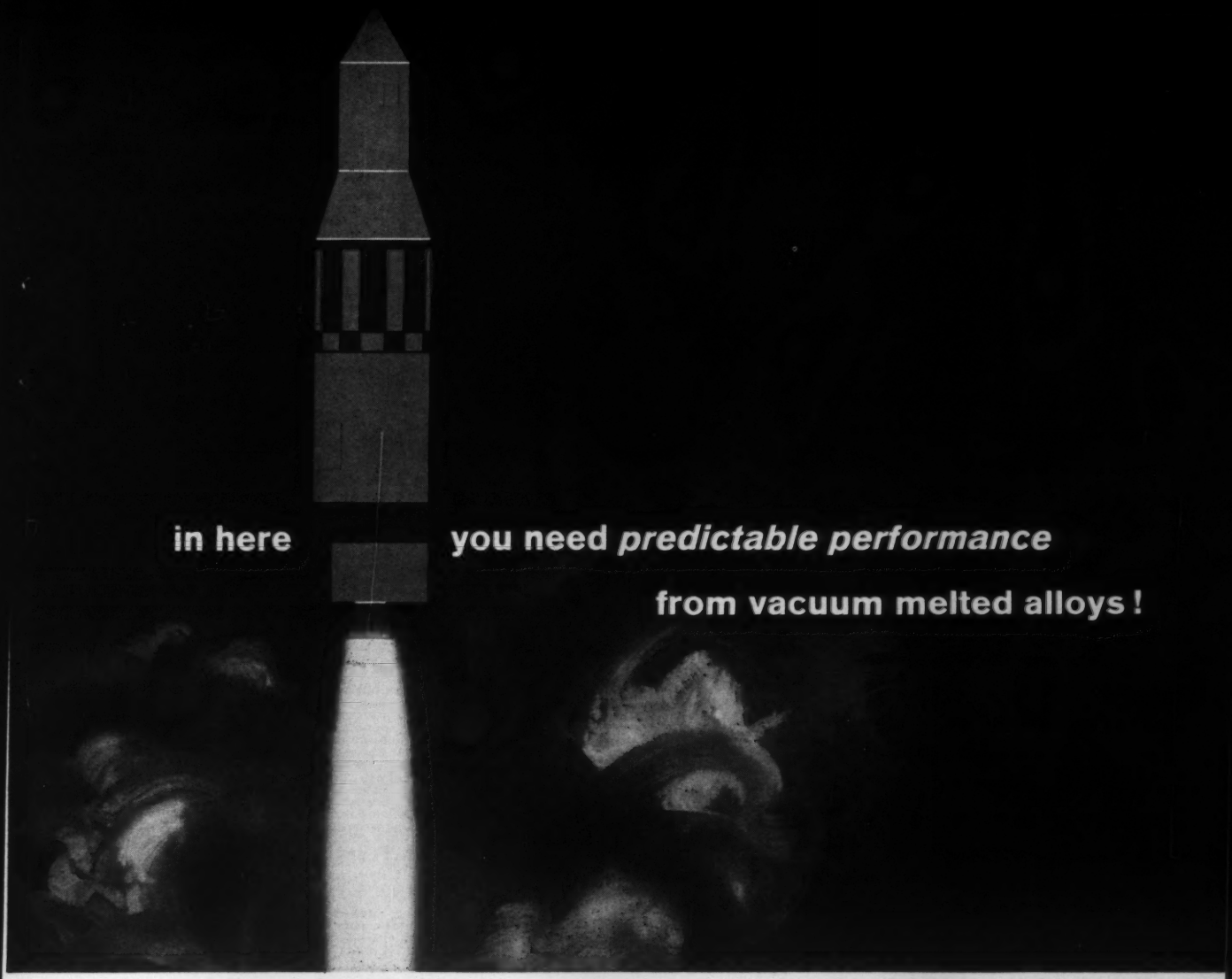
Birmingham — Buying remains light. Prices may level off at present levels, some brokers believe. A local electric furnace has held off on buying since early March.

Buffalo—The only activity in the market was a sale of No. 1 cupola cast at $1 above last week's price. The rest of the market is lifeless.

Boston — Market is unchanged. There is very little business, either on domestic orders or for export. Heavy snows have helped keep the market quiet. More sales are expected when the weather warms up.

West Coast — Business is at a standstill. Dealer intake has fallen off sharply. Lower prices are not encouraging scrap collection. In the Los Angeles area, No. 1 cupola cast is going begging.

Houston—Market is gloomy and slow. Domestic market is showing no zip. But some export continues.



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SCRAP PRICES *(Effective March 22, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	52.00 to 53.00
Rails 2 ft and under	57.00 to 58.00
RR specialties	45.00 to 46.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	44.00 to 45.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	125.00 to 130.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	19.00 to 21.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate, ½ in. and heavier	39.00 to 40.00
Low phos. 2 ft and under	37.00 to 38.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	45.00 to 46.00
Rerolling rails	53.00 to 54.00
Rails 2 ft and under	52.00 to 53.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	50.00 to 51.00
RR couplers and knuckles	41.00 to 42.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	43.00 to 44.00
Cast iron wheels	39.00 to 40.00
Malleable	52.00 to 53.00
Stove plate	40.00 to 41.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $36.00
No. 2 hvy. melting	30.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Clean cast. chem. borings	26.00 to 27.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	40.00 to 41.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	28.00 to 29.00
RR specialties	44.00 to 45.00
Rails, 18 in. and under	58.00 to 60.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	41.00 to 42.00
Cast iron car wheels	46.00 to 47.00
Malleable	63.00 to 64.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. and under	42.00 to 43.00
Rails, random length	48.00 to 49.00
Rails, 18 in. and under	55.00 to 56.00
No. 1 cupola cast.	43.00 to 44.00
Hvy. breakable cast.	36.00 to 37.00
Drop broken cast.	53.00 to 54.00

Youngstown

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Low phos. plate	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	23.50 to 24.50
No. 1 dealer bundles	32.50 to 33.50
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	32.50 to 33.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	39.00 to 40.00
Drop forge flashings	32.50 to 33.50
Low phos. punch'gs plate	33.50 to 34.50
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	48.00 to 49.00
Malleable	52.00 to 53.00
Stainless	
18-8 bundles	210.00 to 220.00
18-8 turnings	90.00 to 100.00
430 bundles	105.00 to 115.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
No. 1 cupola cast.	45.00 to 46.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	20.00 to 21.00
No. 1 RR hvy. melting	36.00 to 37.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	47.00 to 48.00
RR specialties	42.00 to 43.00
Cupola cast.	49.00 to 50.00
Foundry steel, 2 ft.	35.00 to 36.00
Heavy breakable cast.	37.00 to 38.00
Stove plate	40.00 to 41.00
Cast iron car wheels	39.00 to 40.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	39.00 to 40.00

Birmingham

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	37.00 to 38.00
Elec. furnace, 3 ft & under	35.00 to 36.00
Bar crops and plate	41.00 to 42.00
Structural and plate, 2 ft.	40.00 to 41.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	45.00 to 46.00
Rails, 18 in. and under	50.00 to 51.00
Angles and splice bars	42.00 to 43.00
Rerolling rails	51.00 to 52.00
No. 1 cupola cast.	49.00 to 50.00
Stove plate	49.00 to 50.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	38.00 to 39.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	22.00 to 23.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	21.00 to 22.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	36.00 to 37.00
Heavy breakable cast.	34.00 to 35.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	37.00 to 38.00
Mixed cupola cast.	43.00 to 44.00
Automotive cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	200.00 to 205.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	85.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	5.00 to 6.00
Shoveling turnings	8.00 to 9.00
Clean cast. chem. borings	14.50 to 15.50
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	31.00 to 32.00

San Francisco

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	31.00
No. 1 dealer bundles	31.00
No. 2 bundles	20.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	31.00
No. 2 bundles	17.00
Machine shop turn.	16.00
Shoveling turnings	16.00
Cast iron borings	16.00
Elec. furn. 1 ft and under (foundry)	45.00
No. 1 cupola cast.	40.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

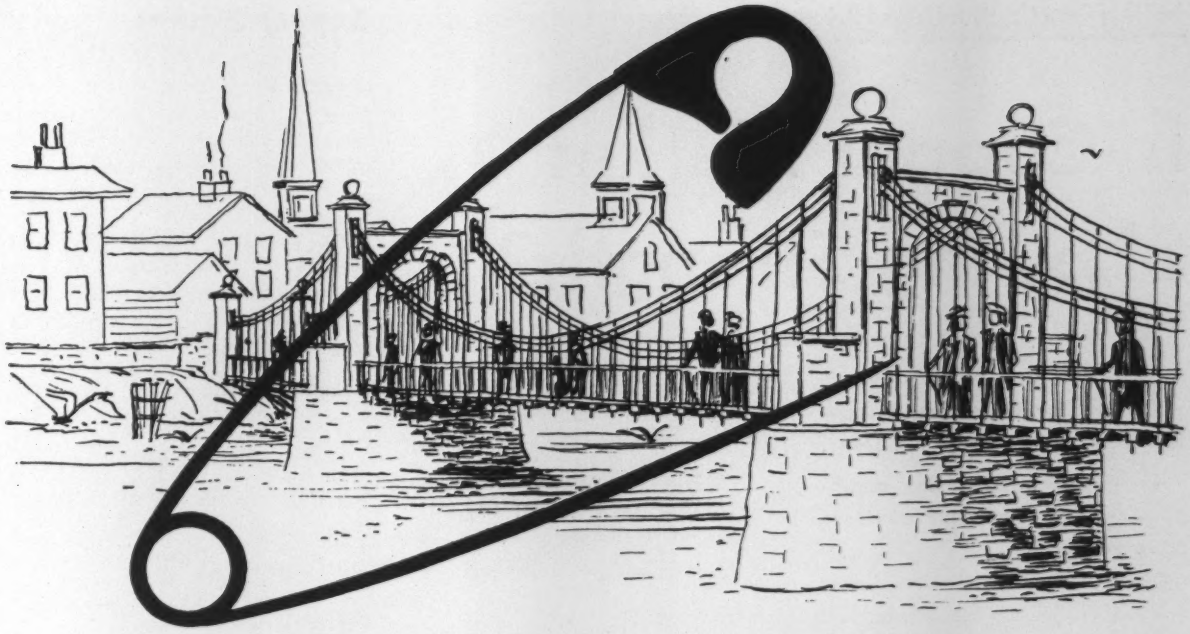
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$43.50 to $44.50
Unstripped motor blocks	32.00 to 33.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	29.00 to 30.00



For Babies and Bridges

The Ninevites made wire in 800 B.C.—other hand-made specimens discovered date as far back as 1700 B.C. The Italians are said to have drawn wire before the tenth century, and in 1565, the draw plate was introduced into England, under permission granted by Queen Elizabeth.

It is not known when the first safety pin was used on a baby, but the first wire suspension bridge in the United States, and probably in the world, was thrown across the Schuylkill River at Philadelphia, in 1816.

Today, millions of miles of steel wire are used, not only for safety pins and suspension bridges, but also for countless other civilian and military requirements. To meet these needs, and for thousands of other steel products, a never-failing supply of scrap must be maintained.

For the purchase or sale of iron or steel scrap . . .

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Is Copper Market Showing Strength?

Orders for May should show the trend in the copper market.

Inventory buildup has disappointed, and customer smelters have suffered.

▪ Is the copper market showing real strength? The trend should be established early in April.

Here's the picture: Major copper producers have closed their order books for April. This means, in effect, they have a market for all the metal they can produce.

May Orders — Books will be opened for orders to be delivered in May on April 1. If there is a burst of orders strong enough to close the books in a week or less, the market will start gaining strength.

Hardest hit this year by the ripening surplus of copper have been the custom smelters and brokers. Producers' copper makes up about ¾ of the domestic supply, and buyers have been getting enough for day-to-day operations from them.

No Inventory Buildup — There has been little attempt to rebuild inventories depleted in riding out the longest strikes in the industry's history. Too many elements are still uncertain for buyers, including price and the outlook for their own businesses.

If hand-to-mouth buying exhausts producers' supplies for May, and forces buyers to custom smelters, it could be the instrument in changing some minds on inventory rebuilding.

Some doubts are cropping up about the effect of inventory rebuilding. For a while, it was conceded that riding out the strike had stripped copper users of inventories.

Are Stocks Really Low? — But, now, a sales manager for one producer suggests that during the strikes plenty of copper was imported so that fabricator stocks aren't now, and never really were, seriously low.

Another copper salesman suggests that fabricator stocks are adequate for the current level of business. He believes fabricators will boost buying only when their volume of new orders forces them to.

On the other hand, the purchasing agent for a utility believes users supplies "are now practically exhausted."

But even if prices are able to weather the current market, they are almost sure to fall later in the year.

A brass and bronze buyer for a fabricator suggests the producers will work backwards toward 30¢ per-lb-copper by mid 1960.

Several other buyers believe the price may sag when pipelines from refineries start flowing again.

Kennecott Plans—Kennecott Copper Co. wants to invest $200 million in expanding its El Teniente operation in Chile. Company president Charles R. Cox has discussed the subject with Chilean President Alessandri.

Frank Milliken, Kennecott executive vice president, is now in Chile for further talks. A company spokesman said the project hingles on acceptance of guarantees by Chile that the company believes it needs to go ahead with such a large project.

Copper Figures

In February in the U. S., production and deliveries of refined copper picked up notably, while unsold stocks at the refineries dropped to the lowest point in the last six months.

In the market outside the U. S., which is largely in Europe, production and deliveries both fell, and the refineries wound up the month with more unsold metal than at the start.

Totals for February:

	U. S.	Outside
Output	105,417	164,535
Delivered	111,851	168,805
Unsold	64,007	238,344

(Short tons)

Aluminum

The Aluminum and Magnesium Div., Business and Defense Services Adm., is looking for another record-breaking year for aluminum in 1960.

The Dept. of Commerce agency predicts a new record for domestic output, domestic secondary recovery, and total sources of supply.

Tin prices for the week: March 16—100.50; March 17—100.50; March 18—100.25; March 21—99.875; March 22—100.00*.

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 138.**

Employees at Bristol Brass are Your Greatest Asset

Fine craftsmanship can be trained only one way . . . by setting the highest possible standards of performance — *and making them stick.* Here at Bristol Brass no one is ever asked to produce "commercial grade". He *wouldn't know how.*

Time after time, job after job, every Bristol customer receives the same uniformly high, intelligently interpreted reproduction of product by loyal veteran mill men and deft newcomers. This is "Bristol Fashion" . . producing Brass sheet, rod, wire second to none. The BRISTOL BRASS Corporation. Since 1850, makers of Brass strip, rod and wire in Bristol, Connecticut. Bristol Brass has offices or warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse *and for brass forgings, too* . . . Accurate Brass Corp. (subsidiary of The Bristol Brass Corp.), Bristol, Connecticut.

"BRISTOL FASHION" MEANS BRASS AT ITS BEST

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ... $ 1.31
Cobalt, 97-99% (per lb) ... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.75
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 44.00
- No. 215 ..... 40.75
- No. 245 ..... 36.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 25.25-26.25
- Grade 2—92-95% 24.00-25.00
- Grade 3—90-92% 23.00-24.00
- Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26½
- No. 2 copper wire 23¾
- Light copper 21½
- *Refinery brass 21¾
- Copper bearing material 21

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26¼
- No. 2 copper wire 23½
- Light copper 21¼
- No. 1 composition 20
- No. 1 comp. turnings 19½
- Hvy. yellow brass solids 15
- Brass pipe 14½
- Radiators 16

Aluminum

- Mixed old cast. ..... 14½—15½
- Mixed new clips ..... 16½—17½
- Mixed turnings, dry ..... 15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 23 —23½
- No. 2 copper wire ..... 20 —20½
- Light copper ..... 18 —18½
- Auto radiators (unsweated). 12½—13
- No. 1 composition ..... 16½—17
- No. 1 composition turnings.. 15½—16
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass ... 11¾—12¼
- Brass pipe ..... 13½—14
- New soft brass clippings .... 14 —14½
- No. 1 brass rod turnings .... 11½—12

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old Zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stero. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

(Effective Mar. 22, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1; C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.00 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Mar. 22, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective Mar. 22, 1960)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5 675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Mar. 22, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	+6.25	.....	+2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective Mar. 22, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12 55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Mar. 22, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"U" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	....	....	190	9.00	9.675
Atlanta *A8***	175	192	....	214	198	8.75	9.425
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9 00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9 00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	....	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9 00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	....	....	213	9.95	10.50
Rankin, Pa. *A5*	173	187	....	....	193	9 00	9.55
So. Chicago *R3*	173	187	....	....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9 30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12,90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12,90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7.s*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Molding Grades	
Electrolytic, domestic f.o.b. shipping point	48.00
Precipitated	47.50
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	49.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine ½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅜" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅜" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. 25,000-and over	60	..
5/16 to ½" diam. incl. 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	.10	8.63	10.10	10.16	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.41	9.29	9.50	9.09	13.14	16.76	.....	.....	.....
Boston**	.10	9.73	10.50	11.87	11.70	9.81	10.62	10.01	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.67	10.41	12.193	11.28	9.47	9.34	9.13	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.75	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.20	10.10	10.99	11.20	9.65	9.95	9.60	12.05	16.58	16.48	20.08	20.03
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	17.35	22.90	22.20
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.69	10.73	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Mar. 22, 1960)

(Ferroalloy prices will next appear in the March 31 issue.)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective Mar. 22, 1960)

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(2) 3500-K.W. Al. Chal. 5-unit Sets of (2) 1750-KW Gen., 350/700-VDC, (1) 5000-H.P. Syn. Motor, 13800/6900/4160-V., 3 ph., 60 cy. (1) 40-KW & (1) 10-KW Exciters.

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QU.	KW	MAKE	D.C. VOLTS	A.C. VOLTS
1	2400	G.E.	250	4600/2300
1	1500	G.E.	250	4600/2300
1	1250	G.E.	132/265	4160
2	500	Whse.	280	4000/2300
1	400	G.E.	275	4000/2300
1	300	G.E.	250	4000/2300
4	250	Whse.	250	2300
2	200	G.E.	260/275	4000/2300
2	150	G.E.	250	440
1	125	G.E.	250	440
1	100	G.E.	250	440

(1)—1250-KVA Whse. Hi-Cycle Frequency Set, 800-V., 960 cycle with 1875-HP syn. motor, 2300-V., 3 ph., 60 cy. with all switchgear.

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SIZE	TRADE NAME	WEIGHT
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5¼" Rd	Hot Form #2	48,500#
4" Rd	Chro-Mow	2,700#
3½" Rd	Chro-Mow	28,000#
3½" Rd	Hot Form #1	12,800#
1⅛" RG CG	Carpenter #883	10,000#

WATER HARDENING

SIZE	TRADE NAME	WEIGHT
5¾" Rd	"CFS"	17,700#
5" Rd	Leco	5,900#
4¼" Rd	"CFS"	6,100#
4⅛" Rd	Crucible Dbl. Spec.	14,700#
3" Rd	Carp. "K.W."	16,000#
.655 Rd	AMS 5132	16,000#
1¾" x 1"	Silver Star	33,300#
1½" x 1"	Silver Star	1,700#

OIL HARDENING

SIZE	TRADE NAME	WEIGHT
4" Rd	Vibro	31,000#
1¾" x 2"	"711"	6,000#
⅞" Rd	"711"	12,500#
9/16" Rd	Magic Chisel	44,700#
7/16" Rd	"711"	1,980#

All the items listed are NAME BRANDS — Fine Quality Tool Steels — Send for Complete Description List.

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WOodward 1-8277

Used Machine Sales Slow at New York

Right now buyers are not showing too much interest in buying used equipment.

But dealers are hopeful the pace will pick up before long.

■ Used machinery dealers in New York are generally unhappy about the current picture. But their appraisals of the market seem to show some optimism.

One dealer says things are "on the slow side." Another says business is "not so hot." And a third reports sales "not too good."

More Inquiries—But one of the dealers points out that while his sales aren't satisfying, his inquiry rate is definitely up. He has several explanations for this.

Many potential buyers are not too interested now, but expect to need more equipment before the year is out he suggests. They're canvassing the market now so they can move in a hurry later.

And this dealer says a number of askers have told him they are bidding for production contracts which would require additional equipment. If they get the award they will buy. If not they won't.

However, someone has to win, and dealers are looking for a pickup in sales before too much longer.

Poor Weather Hurts — Another dealer says his inquiry rate isn't too good. But he believes the unusually bad streak of weather has kept potential buyers in their plants. So this dealer is mailing out about 4000 circulars with a general description of what he has. And he is confident he'll get a good return.

What demand there is, is for fabricating equipment. There has been some out-of-town business in rolling equipment. But machine tools are very soft. There are just too many for the demand.

Price doesn't seem to be a factor. One dealer reports that just a month or so ago he moved several large machines with a minimum of bargaining.

On the Market

FOR SALE: Edward D. Testo, Cleveland machinery salesman, sits in a lathe capable of drilling a 50 ft long hole. The lathe was originally built for shipment to Russia, but was withheld from shipment by the U. S. Now it's up for sale.

DEDUCT 25%
FROM PRICES BELOW
MUST VACATE
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1200-ton Southwark, platen 42" x 60", stroke 36", daylight 72". Price inquire.
750-ton Southwark, platen 76" x 61", stroke 22", daylight 36". Price $37,500.
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500-ton Elmes, platen 35" x 66", stroke 18", daylight 32". Price $18,750.
400-ton W.S., platen 41" x 36", stroke 36", daylight 108". Price $11,750.
200-ton Southwark, 88 ton cushion platen 33" x 28", stroke 24", daylight 50". Price $11,750.
150-ton Southwark, platen 28" x 45", stroke 30", daylight 38". Price $7,500.
150-ton Bliss straightening, bed 112" x 41", stroke 24", daylight 38". Price $8,500.
150-ton H.P.M., triple action, bed 36" x 36", 50 ton blank holder & cushion. Price inquire.
2000-ton Birdsboro 30" stroke 12' x 53½" bet. posts $42,500.

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1—5 ton SWINDELL Top Charge—5000 KVA
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1—5 KW G. E. Tube Type Induction Heater
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1—48" WHEELABRATOR Swing Table
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Quan.	Size	Description
2	3000 HP	DC MOTORS—525 V. 600 RPM Whse. M.G. Sets—2500 K.W. Whse., 2300/4160 V.
1	2750 HP	DC MOTOR 450 V. 300 RPM Elliott 2200 K.W., Gen. Elec. 3 unit 450 V. DC Gen. with 3000 H.P. 720 RPM, 2300 V. AC Motor and Etc.
1	2250 HP	DC MOTOR 600 V. 400/500 RPM, G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1	1500 HP	DC MOTOR 600 V. 600 RPM Whse. M.G. Set. 1500 K.W. G.E. 13200 V.
1	1500 HP	DC MOTOR 600 V. 300/700 RPM Whse. M.G. Set, 1350 K.W. Whse. 2300 V.

For listing of Motors, Generators, Transformers, M.G. Sets, Mill Motors, etc.
See last week issue.

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138 CFM	100 psi	7 x 7 Ing.—CPT—Worth.
142 CFM	125 psi	Ingersoll Rand Type 40-Jaeger
183 CFM	150 psi	7 x 7 Joy WG9
191 CFM	300 psi	9-4½ x 9 ES-2
194 CFM	125 psi	7-7-9 x 5 Worth. M40
234 CFM	100 psi	9 x 9 Ing.—Worth. Chic Penn
288 CFM	500 psi	10-4¼ x 10 Ing.
290 CFM	75 psi	10 x 9 Ing. ES-1
384 CFM	100 psi	10 x 8 Joy WG9
445 CFM	100 psi	Gardner Denver "WB"
465 CFM	100 psi	12 x 11 IR—CPT
502 CFM	125 psi	12 x 13 CP
585 CFM	100 psi	15-9¼ x 12 Ing.
686 CFM	100 psi	14 x 13 IR—CPT
878 CFM	100 psi	15-9½ x 12 Ing. XRB-Worth.
877 CFM	125 psi	17/10½ x 14—IR—XRB
2506 CFM	50 psi	19/19 x 14 Penn—DE—I
	300 hp.	EM sys. Motor 3/60/2300
3079 CFM	110 psi	30/18 x 21 IR—PRE-2
	500 hp.	G.E. Sys. Motor 3/60/2300/4000

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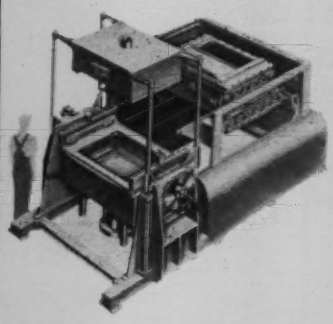

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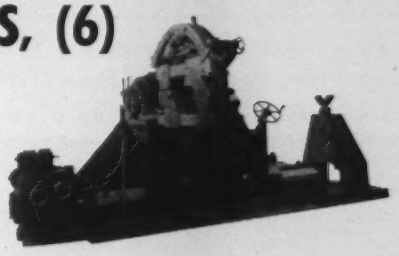

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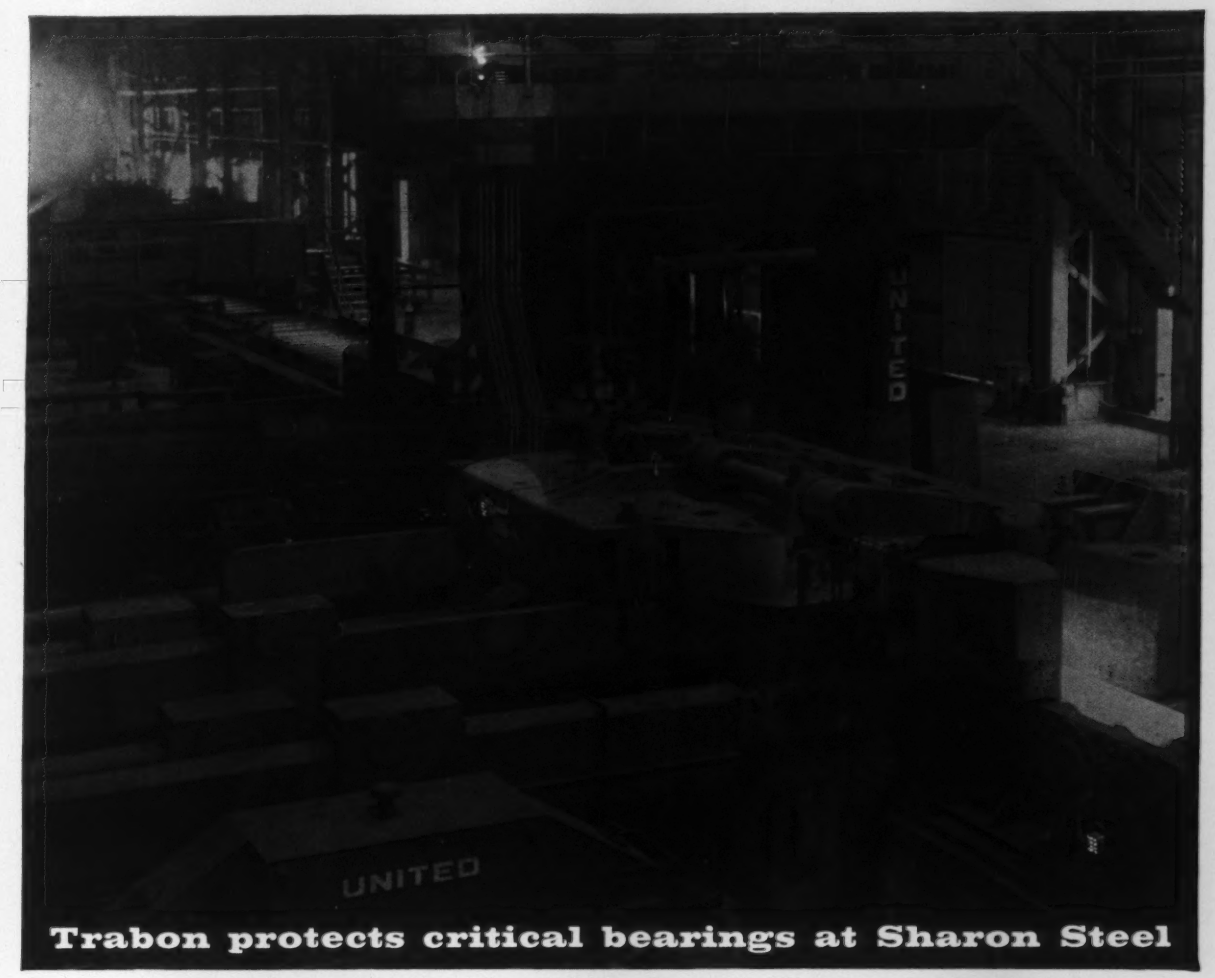

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